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DOWNTOWN EXTENSION PROJECT
CONCEPTUAL DESIGN AND DRAFT EIS/EIR

Volume II - Appendices

Geotechnical Site Investigation

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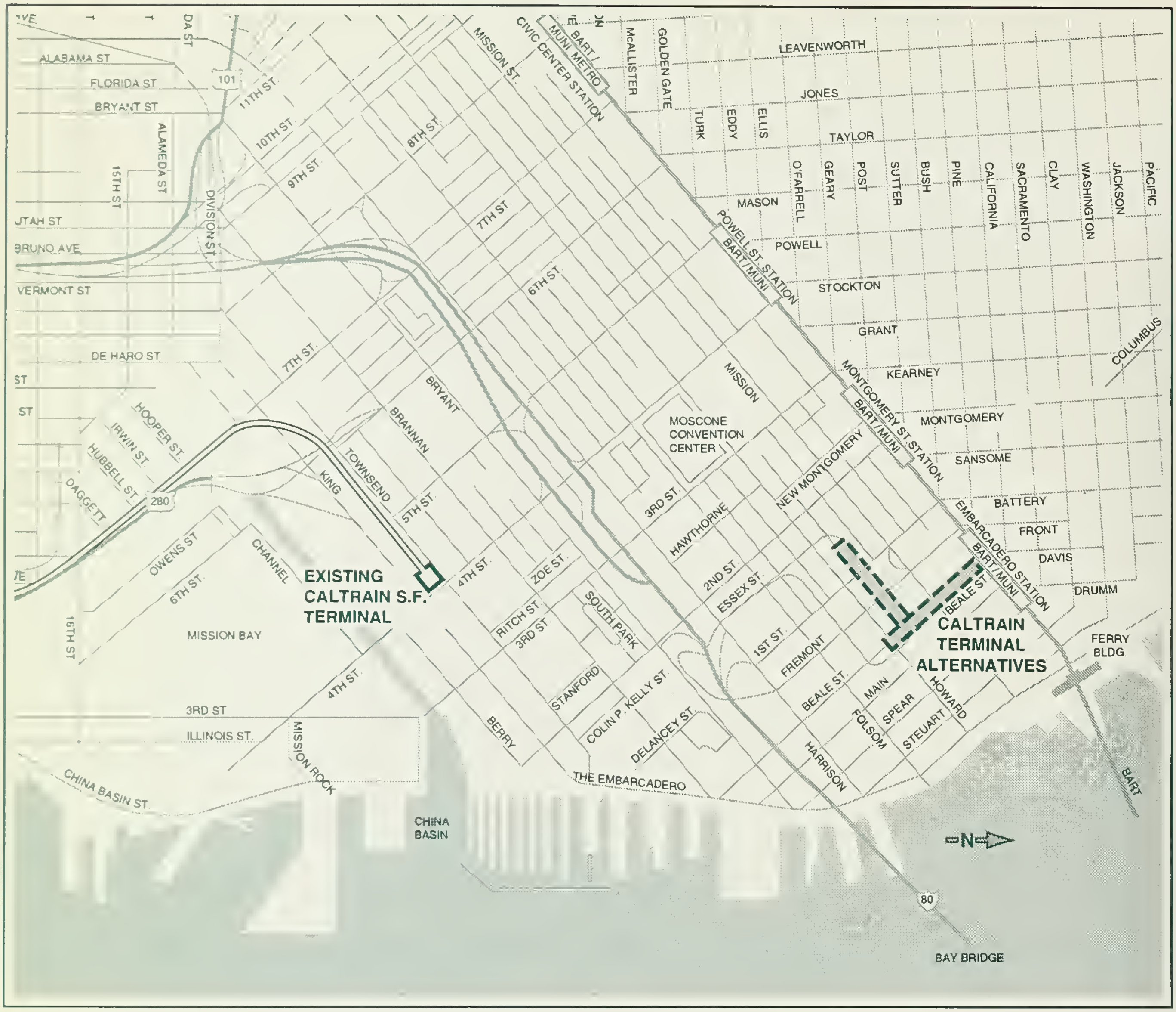
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FINAL REPORT
OTECHNICAL SITE INVESTIGATION
N S.F. DOWNTOWN STATION RELOCATION
EIS/EIR PROJECT
VOLUME II
APPENDICES A AND B

Job No. 30751-001-003
September 25, 1995

DAMES & MOORE

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Final report,
geotechnical site
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APPENDIX A

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APPENDIX A

FIELD EXPLORATION AND TESTING

APPENDIX A

FIELD EXPLORATION AND TESTING

TABLE OF CONTENTS

LOCATION OF EXPLORATIONS A-1
DRILLING AND SAMPLING A-2
FIELD VANE SHEAR TESTS A-5
  Equipment A-5
  Test Procedure A-6
  Test Results A-6
DISPOSAL OF CUTTINGS A-7

LIST OF PLATES

Plate No.	Title
A-1	Field Investigation Location Plan
A-2 to A-11	Logs of Borings and Photographs of Rock Core Boxes
A-12 to A-16	Logs of Field Vanes
A-17	Soil Classification Chart and Key to Test Data
A-18	Summary of Field Vane Shear Tests
A-19 to A-23	Results of Field Vane Shear Test (FV-2 to FV-6)

APPENDIX A

FIELD EXPLORATION AND TESTING

The following field exploration and techniques were used during the CalTrain S.F. Downtown site investigation for the proposed alignment alternative relocation project:

- Soil and Rock Sample Boreholes; and
- Field Vane Shear Tests.

After presenting an account of the steps taken to locate the explorations in the field, this appendix presents a detailed description of each of these methods (objectives, procedures, and equipment) and their results.

LOCATION OF EXPLORATIONS

The exploration locations were chosen to supplement the existing information in the vicinity of the proposed alignments. Ten borings and five field vane shear tests were located along the different segments of the alignments with the principal objectives of investigating the engineering characteristics of the soils and rock formations. While meeting these objectives, the locations also had to be chosen within the following constraints:

- Avoid underground utilities;
- Work within an overhead clearance of 30 feet imposed by electrical lines;
- Avoid surface obstructions;
- Comply with traffic closure restrictions; and
- Work within restricted working hours.

Given the objectives of the program and these constraints, the following program was performed at locations shown on Plate A-1:

- 10 Borings; and
- 5 Field Vane Shear Tests.

The completed program is somewhat different from that described in our proposals to ICF Kaiser Engineers dated April 10 and July 25, 1995 as some of the explorations had to be moved because their proposed locations conflicted with the constraints noted above.

AGS, Inc., through a subcontract with ICF Kaiser, performed the field supervision of drilling the borings. Dames & Moore and AGS, Inc. performed a walkthrough of the alignment routes on April 17, 1995 and located and marked the borehole and field vane locations. AGS, Inc. subsequently obtained all necessary permits for drilling on city streets.

The exploration locations were checked for conflict with underground utilities by AGS, Inc., who contacted the Underground Service Alert (USA) Network. USA in turn alerted the various utility companies that a subsurface investigation was to be conducted near their utilities. The utility companies came to the site and marked the approximate location of their lines in the vicinity of the proposed exploration. Several iterations of choosing locations and checking for utilities were often required to determine suitable locations. In addition, the borehole and field vane locations were independently checked by a utility locating subcontractor retained by AGS, Inc. to make sure that the marked locations were in fact clear of utilities.

After appropriate permits were obtained from various agencies, the field work began on May 2, 1995. The field work was performed in two phases. The first included borings B-1 through B-9 and field vanes FV-2 and FV-3 which were drilled beween May 2 and June 13, 1995. The second phase included Borings B-10 and B-11 and field vanes FV-4, FV-5, and FV-6, which were drilled between July 26 and August 4, 1995.

DRILLING AND SAMPLING

Borings were performed primarily to aid in evaluation of subsurface stratigraphy along the different sections of the proposed alignments. They also allowed acquisition of high-quality soil samples for laboratory testing.

Ten borings were drilled and sampled at the locations indicated on Plate A-1. The depth of the borings varied from 52 feet to 150 feet as shown on the table below. A truck-mounted rotary wash type drill rig (Failing 750) was used to drill the boreholes. The drilling was carried out by Pitcher Drilling Company of Palo Alto, California, under the supervision of an AGS, Inc. engineer, who maintained records of all field activities, classified the soils and rocks encountered, and maintained a continuous log of the borings. Dames & Moore supervised the field activities

for FV-2 through FV-6. Logs of the borings based on field classification and subsequent laboratory testing are presented on Plates A-2 through A-16. Photographs of core boxes with rock samples are presented immediately after the relevant boring log on Plates A-2 through A-10. A key to the soil classifications and test data on the logs is given on Plate A-17.

Boring Number	Depth (feet)
B-1	117.0
B-2	52.0
B-3	81.8
B-4	135.0
B-5	150.0
B-7	54.0
B-8	98.4
B-9	77.5
B-10	72.0
B-11	96.0
FV-2	61.5
FV-3	60.0
FV-4	92.2
FV-5	89.5
FV-6	61.0

The drilling operation proceeded very carefully, with particular attention to potential interference with utilities or other buried structures. In fact, boring B-3 was moved once and field vane FV-3 was moved three times because of underground obstructions. Because the Bay Mud stratum encountered in FV-2 was thin, we converted this location to a boring after the completion of the field vane testing. The sandy strata underlying the Bay Mud were drilled and sampled to a total depth of 61.5 feet below existing ground surface. After completing the field vane shear tests in Bay Mud to a depth of 40 feet at the FV-6 location, the borehole was extended and sampled to a depth of 61 feet below existing ground surface.

During drilling, both disturbed and undisturbed samples were obtained for identification and laboratory testing. Soil samples were generally obtained at 5-foot intervals in the fill and underlying soils. Bedrock was continuously sampled or cored for a total depth of 50 to 80 feet with the exception of boring B-5 where rock was only penetrated a distance of about 5 feet.

Because bedrock at B-5 was encountered at a depth of 145 feet, which is well below the invert depth for the alignment alternative, it was judged that deeper rock coring was not necessary. Boring B-11 was stopped at a depth of 96 feet below existing ground surface without reaching bedrock. There are sufficient existing subsurface data in the vicinity of boring B-11 to estimate bedrock depth.

Several types of samplers were used, as described in the following paragraphs. The choice of sampler type was based on the soil type and the sample quality required for laboratory testing.

- SPT. The Standard Penetration Test (ASTM D-1586) sampler was used in the granular soils to obtain relatively disturbed samples for soil identification and to obtain penetration resistance data for correlation with engineering properties.
- Dames & Moore U-Sampler. The U-Sampler was used primarily in granular soils but also occasionally in the cohesive deposits. This ring-lined barrel sampler, with a nominal 2½-inch inner diameter and 3¼-inch outer diameter, is in substantial compliance with ASTM D-3550. The sampler is driven by a down-hole wireline hammer. In this investigation, the same hammer used for the SPT test was use to drive the U-Sampler: a 140 lb. hammer falling 30 inches. The blow count recorded on the boring logs adjacent to the sample depth is the number of blows required to drive the sampler for the final 12 inches of an 18-inch drive.
- Fixed Piston. A stationary piston sampler was used to obtain relatively undisturbed samples of the medium stiff cohesive soils for determination of engineering properties. The Dames & Moore piston sampler uses 2½-inch-diameter, 18-inch-long brass piston tubes, pushed hydraulically into the soil.
- Pitcher Barrel. A Pitcher Barrel sampler was used to take undisturbed samples of the stiff clays and stiff to very stiff Old Bay Clay, lower clays and sands, and soft highly fractured and weathered rock. This sampler is spring-loaded with a cutting shoe, and takes Shelby tube samples by either pushing into or cutting through the soil to be sampled, depending on the soil's density or stiffness. A 3-inch-diameter, 3-foot-long Shelby tube was used.
- Rock Core Barrel. NQ split barrels with diamond core bit were used to obtain continuous cores of bedrock material. The NQ barrel is a 2-inch diameter diamond bit. Typical core runs were 5 feet in length, occasionally shorter, due to poor sample recovery or jamming of rock within the core barrel. Photographs of the rock core boxes are included at the end of each boring log.

One of the objectives of the field investigation was to obtain high-quality undisturbed samples for laboratory testing. Every effort was made to minimize sample disturbance during sample handling and transportation. After careful withdrawal from the ground, the sample tube was carefully placed upright and the ends of the sample were cleaned of disturbed soil. If possible, Pocket Penetrometer or Torvane tests (on cohesive soils only) were performed on the bottom end of the tube or ring samples. The ring samples were first placed in a plastic bag and then in a plastic container, capped and transported in a padded box. Both ends of the tube samples were sealed with wax, then covered with plastic caps, taped, and the tubes were carefully transported to the Dames & Moore laboratory in downtown San Francisco. Rock cores were placed in special NQ core boxes and transported to our laboratory as well. All soil samples were stored in a room with controlled temperature and humidity until the samples were removed for testing. At the completion of each borehole, the hole was grouted with cement bentonite and the surface patched with asphalt. The grouting was performed in the presence of a San Francisco Health Department official.

FIELD VANE SHEAR TESTS

The major features of the field vane apparatus and test procedures used are described below. The test results are presented in summary tables and plates.

Equipment

Field vane shear tests were performed using the Geonor field vane apparatus, model H-350. Details of the equipment are presented by Andersen and Bjerrum (1986).* The vane shear equipment consists of the vane tip and its housing, vane rods and protective casing, and torque head and assorted parts.

The soil is sheared by rotating the vane tip slowly after it has been extended 17 inches below the protective housing. The vane tip is connected to the vane rods, which extend through the protective pipe all the way to the surface. The torque is applied manually by rotating the crank handle at a predetermined number of revolutions per minute. The torque is measured by a calibrated torque gauge, while the rate of rotation of the crank handle (which is manually controlled) determines the rate of rotation of the vane rods and vane tip.

---

*For references, see the list of references in the Main Report.

The vane rod projecting below the vane housing is protected from soil friction by a protective sleeve pipe. The slender vane rods are prevented from wandering in the casing by the use of brass ring spacers placed at one-meter intervals. A smaller vane tip, 55 mm in diameter and 110 mm high, with capacity up to 2,088 psf, was used to perform the tests in the medium stiff to stiff Bay Mud deposit.

Test Procedure

The fill at each vane shear test location was first predrilled and cased to the top of the Bay Mud layer. Testing started near the top of the Bay Mud. The vane was lowered into the soil until the tip of the protective housing reached a depth of 17 inches above the required test depth. The vane tip was then pushed out of the housing into the soil to the required test depth, and the shear test carried out. The rate of rotation of the manual crank handle was about one revolution per second. Measurements were recorded at 30-second intervals.

At the end of the undisturbed test the vane tip was rotated rapidly for a total of 10 revolutions and then the test was repeated to obtain the remolded strength. Remolded tests were performed only at every second location. At the end of the test the torque head was removed, and the tip was withdrawn back into the housing. Then the vane assembly was advanced to the next test depth. Additional vane rods and protective pipes were added as required to reach the next test depth. This procedure was repeated until the bottom of the Bay Mud was reached. At that point the vane was withdrawn, disassembled, cleaned and all moving parts were lubricated.

Undisturbed vane shear tests were generally performed at 3.3 to 4.0 foot intervals throughout the Recent Bay Mud deposit. Remolded tests were generally performed after every other undisturbed test. The drilling for the field vane tests was done by Pitcher Drilling. All the tests were performed by a Dames & Moore engineer.

Tests Results

The results of the field vane shear tests are summarized on Plate A-18 and also shown on Plates A-19 through A-23 for FV-2 to FV-6, respectively. On each plate, the undisturbed and remolded shear strengths are tabulated and plotted versus depth. The soil stratigraphy is indicated adjacent to the shear strength plot. Sensitivity values, S_t, defined as the undisturbed shear strength divided by the remolded shear strength, are also tabulated using the fullowing equation:

$$S_t = \frac{(S_u)_{undisturbed}}{(S_u)_{remolded}}$$

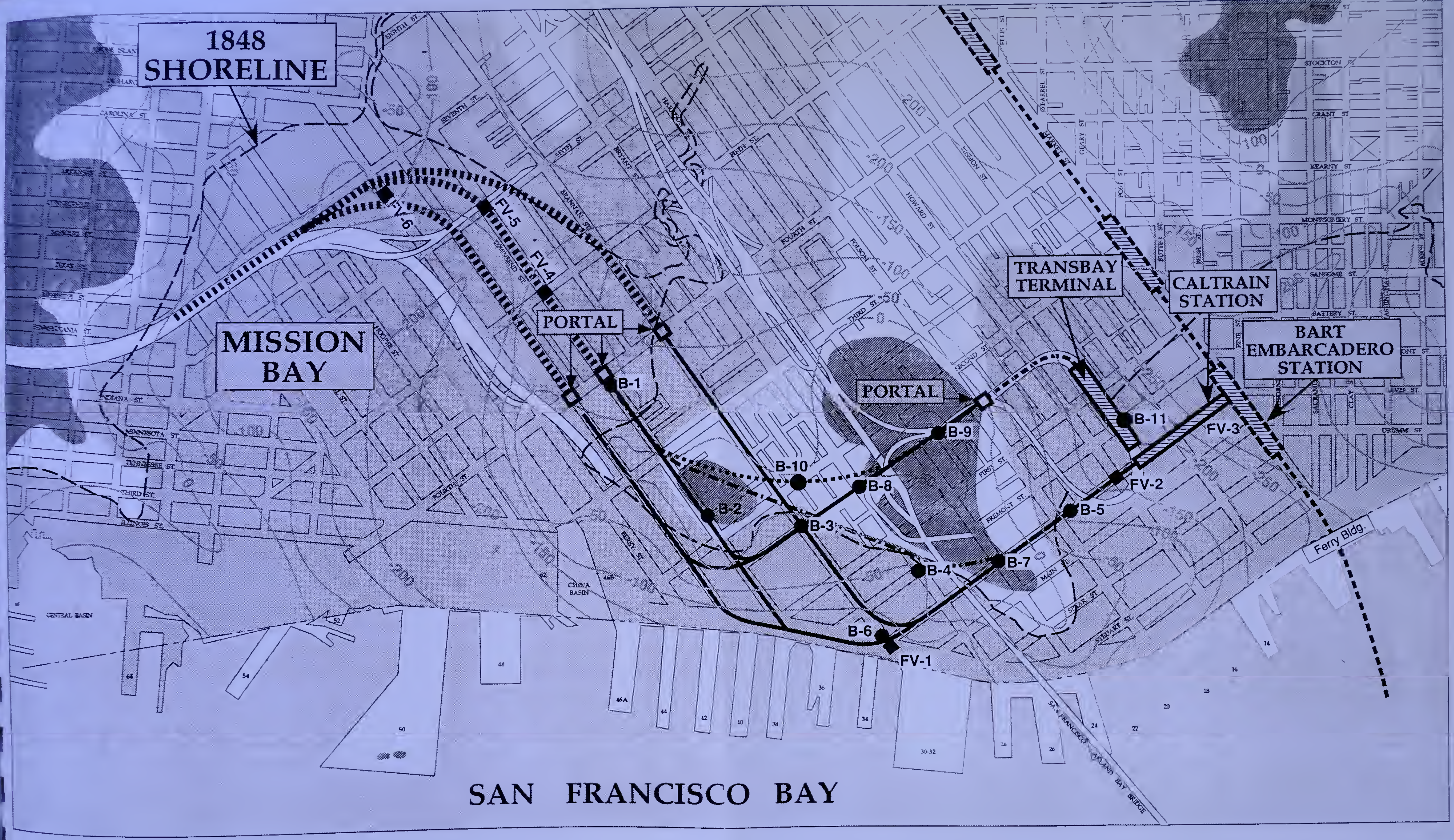
DISPOSAL OF CUTTINGS

Drill cuttings and fluids generated during drilling were temporarily stored in drums provided by Pitcher Drilling. At the end of each day, Pitcher Drilling disposed the contents of the drums into a special bin provided by DECON Environmental Inc. who will be responsible for testing and disposal of drill cuttings in accordance with applicable local, state, and federal regulations.

-oOo-

The following subsections present the results of our field investigations. The field investigations consisted of:

- borings
- field vane shear tests



KEY

- ● B-5 Boring Location
- ■ FV-3 Field Vane Location
- Bedrock Contours (feet)
- ▭ Fill
- ▨ Rock Outcrop

BORING LOCATION PLAN

September 1995
30751-001-003

ICF Kaiser/De Leuw
Caltrain S.F. Downtown Station
Relocation EIS/EIR Project

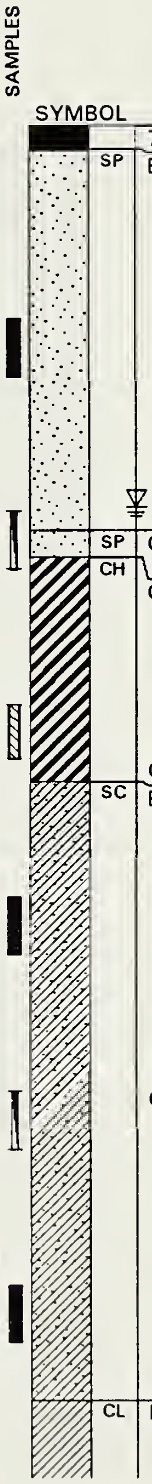
DAMES & MOORE

PLATE A-1

LOGS OF BORINGS AND PHOTOGRAPHS OF ROCK CORE BOXES

The logs of the borings are presented in the following subsection. Ten exploratory borings were drilled at the locations shown on Plate A-1. The borings ranged from 52.0 feet to 150 feet in depth. The logs show the interpreted subsurface conditions for the boring locations at the time the borings were drilled. Included in the boring logs are Unified Soil Classification of different strata, depth of samples, type of samples, and various laboratory test data. Included at the end of each boring log are photographs of the rock core boxes. An explanation of terms used in the logs is presented on Plate A-17.

BORING B-1



DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE		
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)						
0												7-inch thick ASPHALT CONCRETE
											SP	BROWN FINE SAND with little fines, moist, medium dense [FILL]
5							4.1	102.4	U	20		
10									SPT	4	SP	GRAY FINE SAND with little fines, saturated, medium dense
											CH	GRAY PLASTIC CLAY, soft, saturated [BAY MUD]
15		46.4	25.4	TXUU	1650	453			P	120		
												Grades more sandy with trace of shell fragment
											SC	BROWN CLAYEY SAND grades stiffer and more sandy fine sand, medium dense [OLDER ALLUVIAL DEPOSITS]
20	39.4						17.9	135.1	U	22		
25									SPT	36		Grades to dense
30	23.7			DS	1500 2500 3000	1719 2351 2808	17.6	130.6	U	41		
											CL	REDDISH BROWN SANDY LEAN CLAY, stiff
35												

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-1

Dames & Moore, Inc.

Log of Boring

Date Completed: 5/10/95
Boring Depth: 117.0 ft.

Surface Elev: 0.0 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

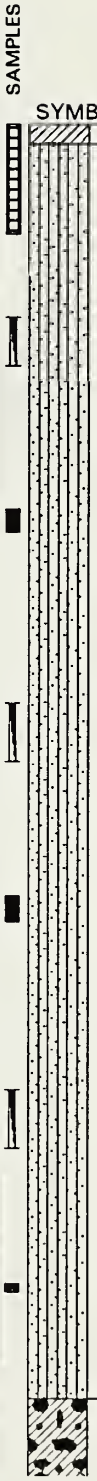
Location:
San Francisco, Calif.

Log Template: SF1B

September 9, 1995

BORING B-1

	LABORATORY TEST DATA								SAMPLING			
		ATTERBERG LIMITS		STRENGTH DATA								
DEPTH IN FEET	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	SYMBOL	DESCRIPTION
35	57.8						19.0	133.2	ST	200	SM	BROWN SILTY FINE SAND, very dense
40	15						22.1		SPT	71		
45	9.7			DS	2000 3000 4000	1941 2683 3353	19.1	128.8	U	50/3"		
												Grades with variable amount of fines
50	39.6						21.4		SPT	40		Grades to clayey sand
55	24.9						21.9	130.5	U	50/4"		
60	18.2						20.5		SPT	49		
65									U	73/6"		Grades to partially cemented
											GC	OLIVE BROWN CLAYEY GRAVEL, very dense, gravel is weathered, angular shale and sandstone (COLLUVIUM)
70												



Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-1

Dames & Moore, Inc.

Log of Boring

Log Template: SF1B

September 9, 1995

BORING B-1

DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE
70							13.9		SPT	65
75									SPT	50/4"
									PT	
80										
85										
90										
95										
100										
105										

SAMPLES SYMBOL DESCRIPTION

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-1

Dames & Moore, Inc.

Log of Boring

Log Template: SF1B

September 9, 1995

BORING B-1

DEPTH IN FEET	ROCK CHARACTERIZATION										
	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SYMBOL	DESCRIPTION	REMARKS
	NQ	1	100	98	1	F	VS	14.6	ST	MEDIUM GRAY SANDSTONE, medium to fine grained, moderately fractured to little fractured with many quartz filled fractures, fresh, very strong	Start coring at 79 feet
80											
	NQ	2	72	11	4	F	VS	9.3			
85											
	NQ	3	90	0	60	F/WS	VW	9.8	SH	DARK GRAY SHALE, intensely fractured and sheared, fresh to slightly weathered, very weak, includes sandstone blocks in shale matrix	
90											
					1	F/WS	S	9.8		Sandstone block 89.9' to 90.4'	
	NQ	4	74	0	60	WS	VW	7.1			
	NQ	5	100	0	10	F	MS	12.5			
95										Sandstone block 94.5' to 95.5'	
	NQ	6	100	0	50	F	VW	16.7			
	NQ	7	100	0	50	F	VW	15.2			
	NQ	8	38	0	50	F	VW	14.5			
	NQ	9	87	37	60	F	VW	8.4			
100											
					10		MS		ST	SANDSTONE, highly sheared, with shale along the sheared surfaces	
105	NQ	10	90	25	10	F	S	10			
					4	F	W	10	SH	SHALE, sheared and crushed with blocks of sandstone	
	NQ	11	97	19	60	F	W	7.3			
110											
					3	F	VS	7.3	ST	SANDSTONE	
	NQ	12	90	0	60	F	VW	8.3	SH	SHALE, sheared, with blocks of	

Continued Next Page

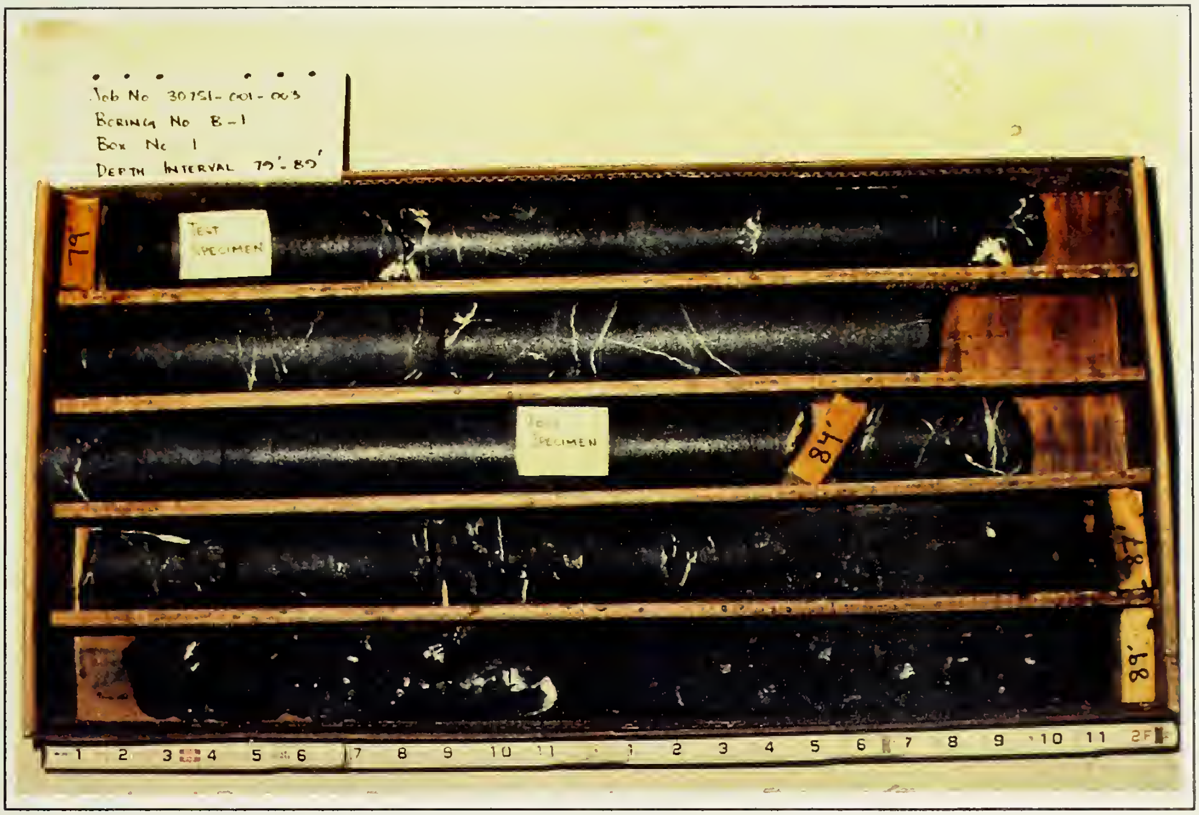
BORING B-1

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SAMPLES	SYMBOL	DESCRIPTION	REMARKS
										▤	sandstone	
115												
120												
125												
130												
135												
140												
145												

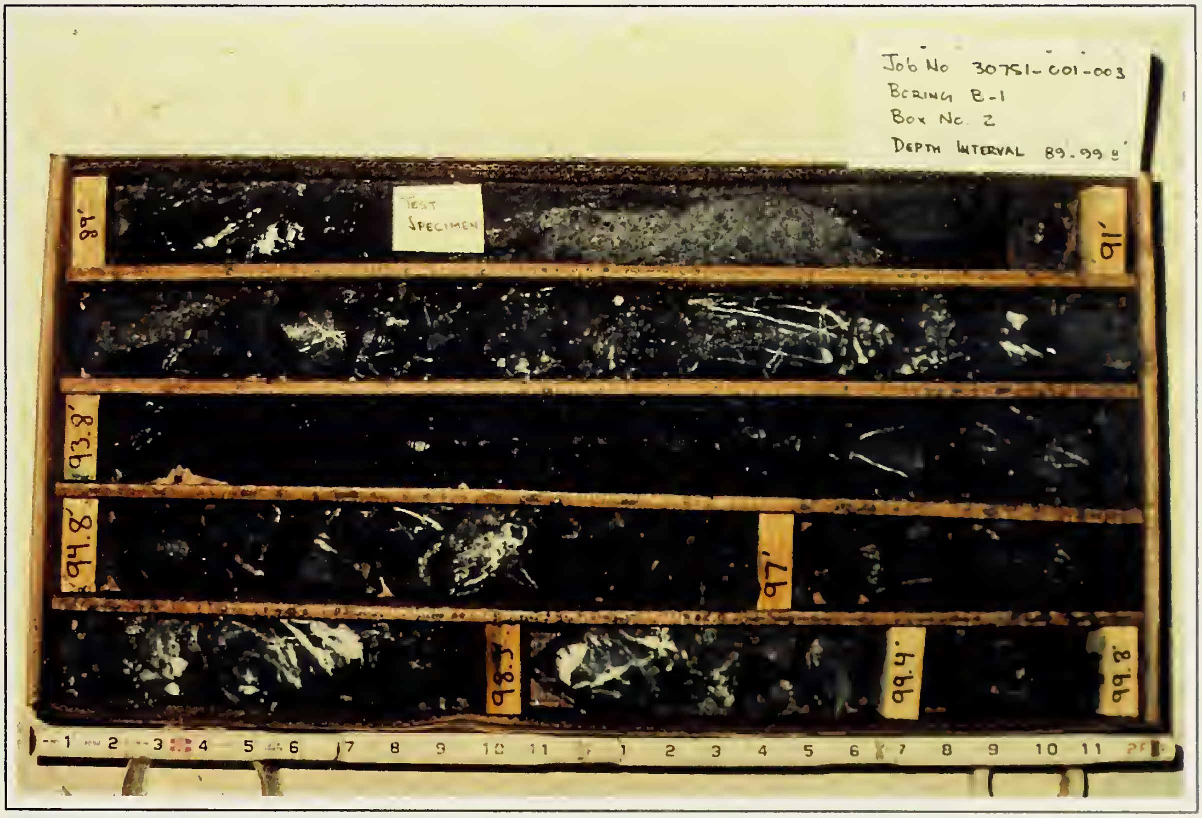
Notes:

1. Boring completed at a depth of 117 feet on 5/10/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.

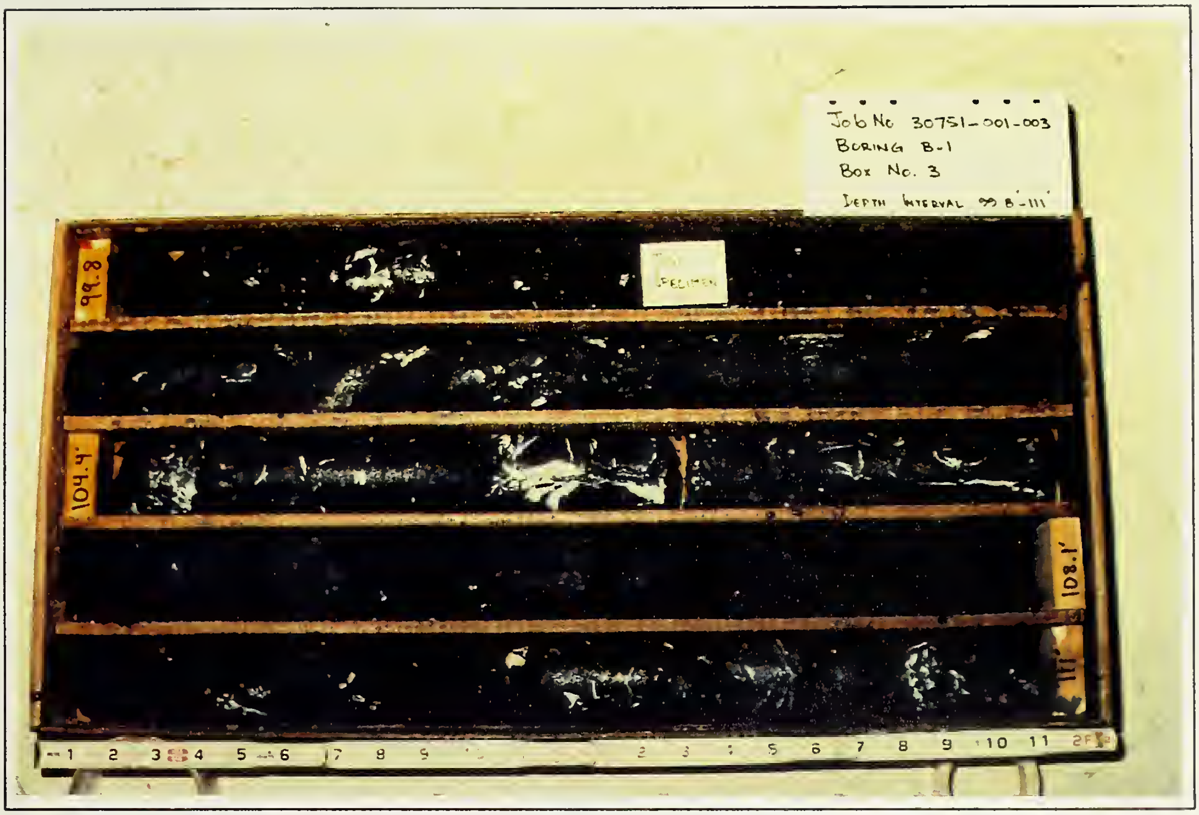
Job No: 30751-001-003 Pt. ID: CALTR / B-1	Dames & Moore, Inc.	Log of Boring



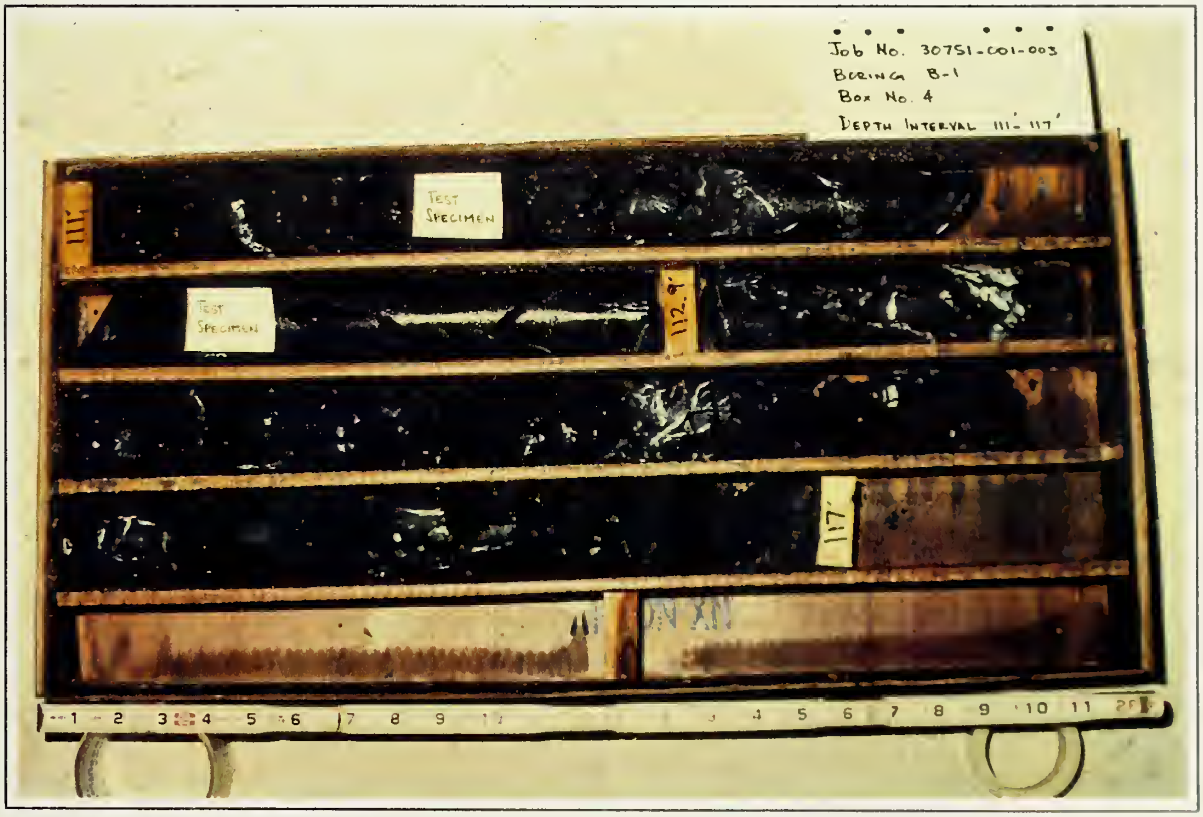
Boring No. B-1: Box No. 1, Depth Interval 79' - 89'



Boring No. B-1: Box No. 2, Depth Interval 89' - 99.8'



Boring No. B-1: Box No. 3, Depth Interval 99.8' - 111'

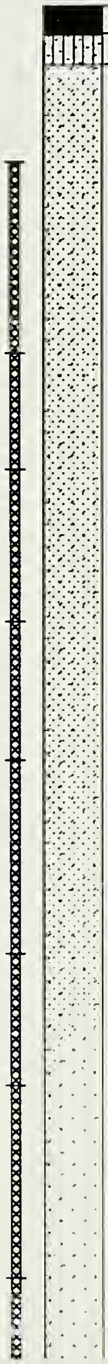


Boring No. B-1: Box No. 4, Depth Interval 111' - 117'

BORING B-2

ROCK CHARACTERIZATION

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
0								
	NQ	1	100	0	5	WM	MS	12.4
5								
	NQ	2	100	0	30	WM	MS	11.7
10								
	NQ	3	100	0	5	WM	MS	16.4
15						WH	W	16.4
	NQ	4	100	0	5	WM	MS	16.7
20	NQ	5	100	33	2	WM	MS	13.6
25	NQ	6	100	22	10	WM	MS	18.8
	NQ	7	100	53	2	WM	MS	13.6
30								
	NQ	8	100	41	4	WS	S	15.4
35								



SYMBOL	DESCRIPTION	REMARKS
	8-inch thick ASPHALT CONCRETE	
SM	SILTY SAND [FILL]	
ST	YELLOWISH BROWN SANDSTONE, closely fractured, quartz filled fractures, moderately weathered to fresh, moderately strong to strong, locally interbedded with dark gray shale	
	Crushed zone 10.8' to 12.5'	
	Intensely fractured/highly weathered zone 15' to 15.9'	
	Highly weathered along fractures at 22.8' to 23.1'	
	Clayey sheared zone 25.8' to 26.1'	
	Possible dissolution of quartz fracture filling 28.5' to 30.4'	

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / B-2	**Dames & Moore, Inc.**	**Log of Boring**
Date Completed: 5/12/95 Boring Depth: 52.0 ft.	Surface Elev: 11.0 ft. (C.C.S.F. Datum) Coordinates: Not surveyed	Location: San Francisco, Calif.

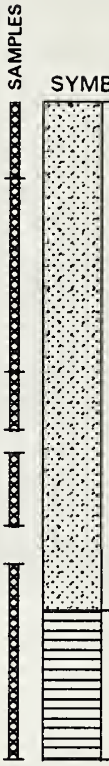
Log Template: 15B

September 9, 1995

BORING B-2

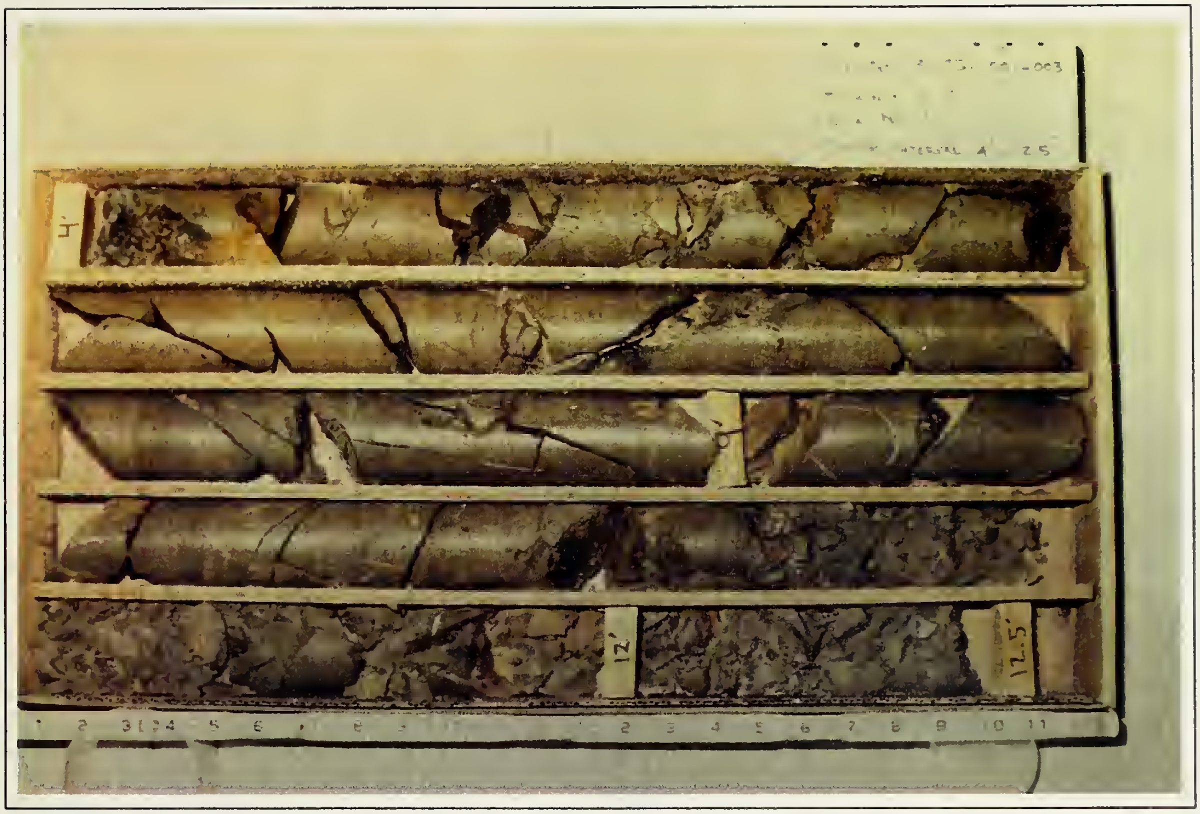
ROCK CHARACTERIZATION

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
35								
	NQ	9	100	15	8	F	S	12.6
40								
	NQ	10	73	56	3	F	S	15.7
	NQ	11	66	0	10	F	MS	12.8
45								
	NQ	12	100	13	60	F	VW	14.8
50								
					5	F	W	14.8
55								
60								
65								
70								

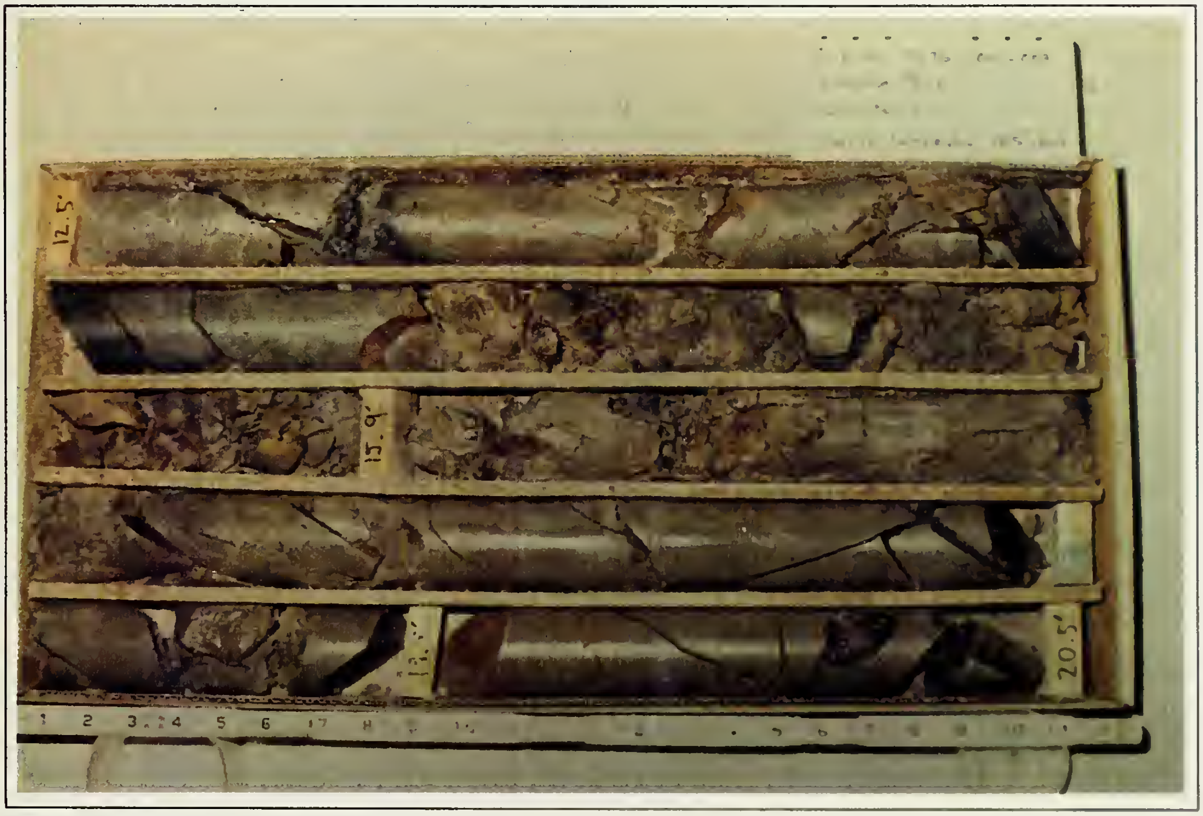


SYMBOL	DESCRIPTION	REMARKS
	Grades to medium gray	
	Abundant shale laminae and rip-up clasts 44.0' to 48.2'	
SH	DARK GRAY SHALE, moderately fractured to crushed, locally sheared, local quartz-filled fractures, fresh, weak, very weak where crushed/sheared.	

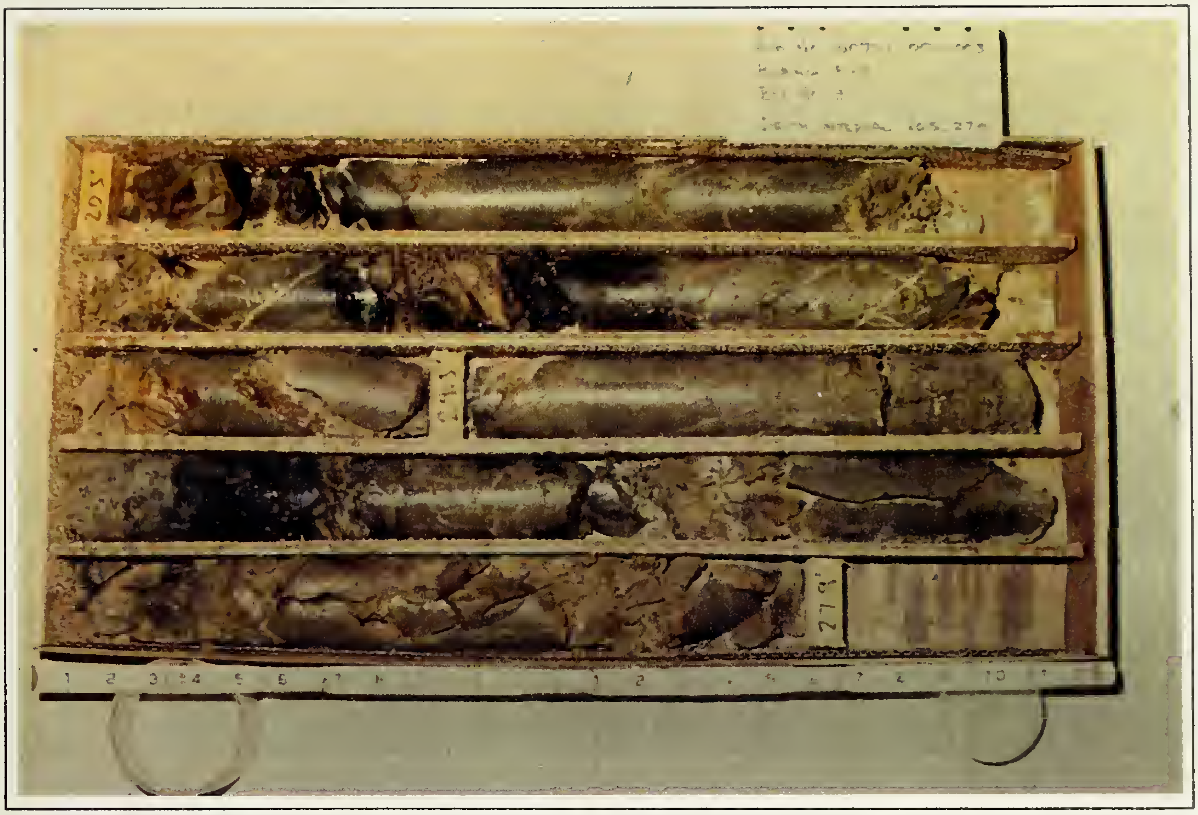
Notes:
1. Boring completed at a depth of 52 feet on 5/12/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.



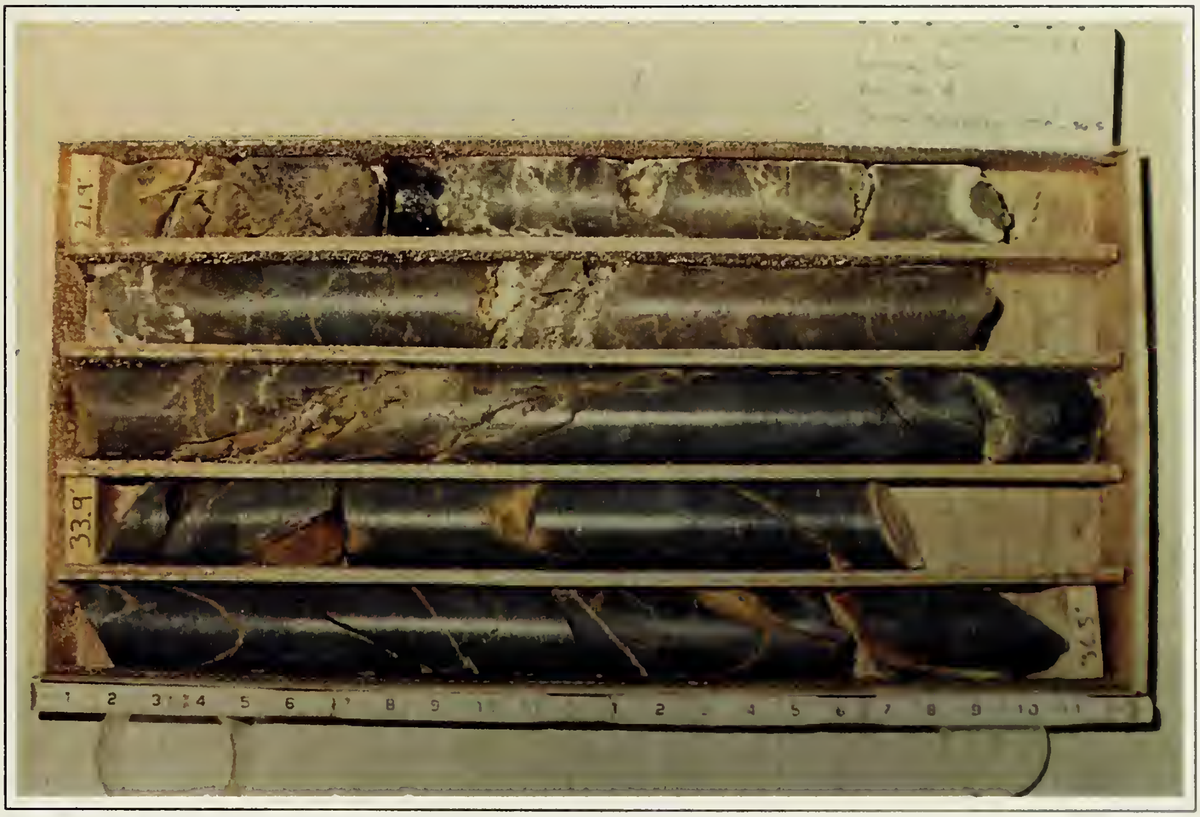
Boring No. B-2: Box No. 1, Depth Interval 4' - 12.5'



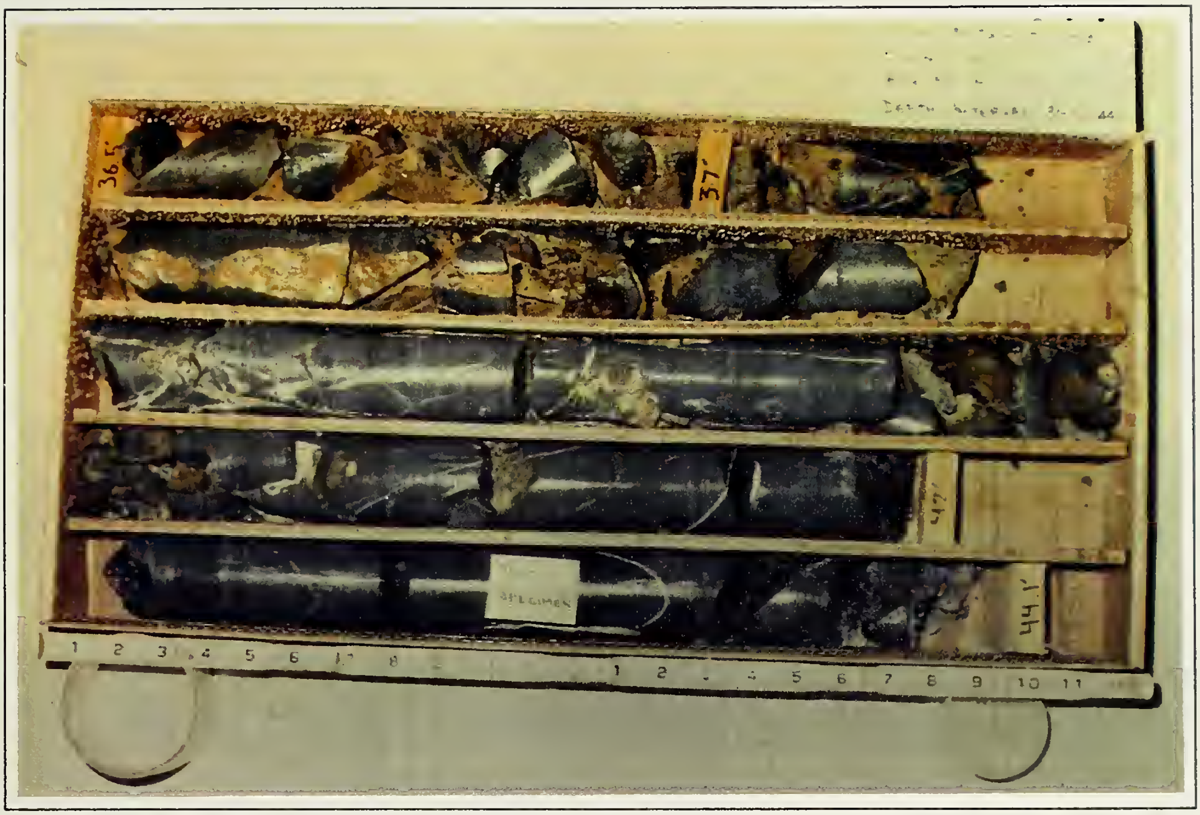
Boring No. B-2: Box No. 2, Depth Interval 12.5' - 20.5'



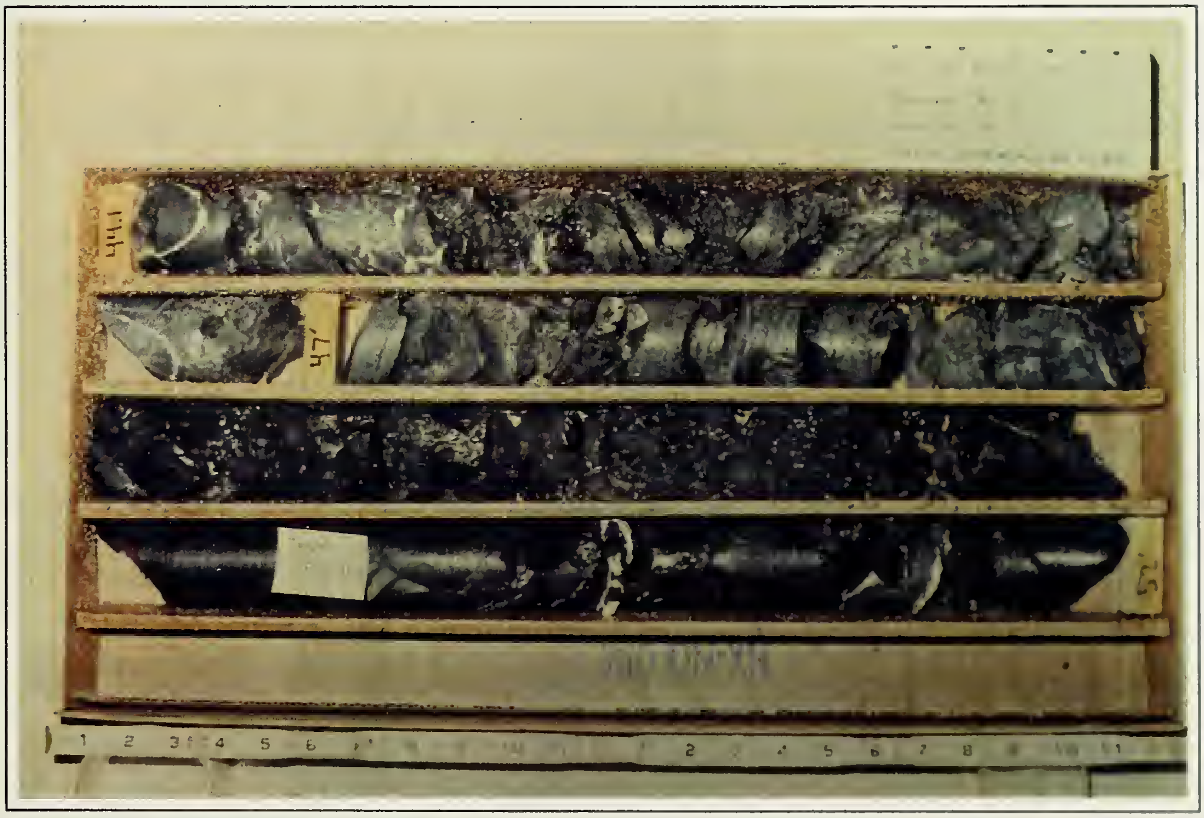
Boring No. B-2: Box No. 3, Depth Interval 20.5' - 27.9'



Boring No. B-2: Box No. 4, Depth Interval 27.9' - 36.5'



Boring No. B-2: Box No. 5, Depth Interval 36.5' - 44.1'



Boring No. B-2: Box No. 6, Depth Interval 44.1' - 52'

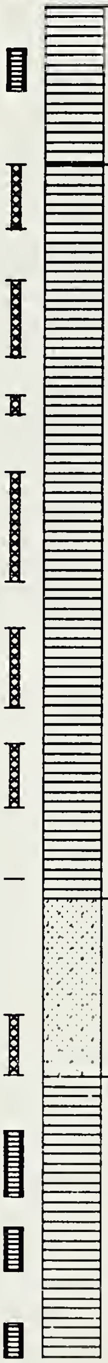
BORING B-3

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)							
0												SP	8-inch thick CONCRETE GRAY AND TAN FINE SAND with pieces of concrete, moist, medium dense [FILL]
5							10.5	108.2	U	13	■		
												CL	BROWN SANDY CLAY, wet, soft [FILL] 3-inch thick CONCRETE BASEMENT SLAB
10							18.3		SPT	4	⌶		
15									P	>300	⌶	GC	BROWN CLAYEY GRAVEL with sand,wet, medium dense, brick fragments [FILL]
												▽	
20	58.9	28.4	12.9				18.8	129.8	U	18	■	CL	BROWN CLAYEY SAND TO SANDY CLAY
												CL	BROWN SANDY LEAN CLAY with gray and black mottling, stiff to very stiff
25							19.7		SPT	11	⌶		
												SM SC	BLACK AND BROWN SILTY FINE SAND with fine gravel to coarse sand and trace of organic material, wet, medium dense
30	17.3						30.6	119.0	U	66/11"	■		
35													

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / B-3	**Dames & Moore, Inc.**	**Log of Boring**
Date Completed: 5/17/95 Boring Depth: 81.8 ft.	Surface Elev: 16.8 ft. (C.C.S.F. Datum) Coordinates: Not surveyed	Location: San Francisco, Calif.

BORING B-3



	ROCK CHARACTERIZATION										
DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SYMBOL	DESCRIPTION	REMARKS
	PT								SH	DARK OLIVE GRAY SHALE, slightly weathered, clayey matrix, moderately weak to weak, extremely close fracture spacing, thinly laminated	
35	NQ	1	55	0	50	WH	W	25	SH	DARK GRAY SHALE, silty, laminated, closely fractured, moderately weathered to highly weathered, weak to moderately strong, very weak in crushed zones	
	NQ	2	67	0	30	WH	W	53.7			
40	NQ	3	29	0	10	WM	W	27			
	NQ	4	71	0	10	WM	W	21			
45	NQ	5	69	0	10	WS	W	24.7		Crushed zone 47.7' to 47.9'	
50	NQ	6	48	0	60	WS	VW	25.1		Crushed zone 50.8' to 54'	
	NQ	7	7	0	20	WS	MS	28.5			
									ST	MEDIUM GRAY SANDSTONE fine grained, closely fractured, slightly weathered, moderately strong, interbedded with shale	
55	NQ	8	53	0		WS	VW	26.7		Crushed zone 57.6' to 58.6'	
									SH	SHALE intensely fractured and weathered	
60	PT	9	70								TXUU Su = 4641 psf
	PT	10	47								MC = 10.7% TD = 145.4 pcf
65	PT	11	59								TXUU Su = 3785 psf

Continued Next Page

BORING B-3

DEPTH IN FEET	ROCK CHARACTERIZATION								SAMPLES	SYMBOL	DESCRIPTION	REMARKS
	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)				
	PT	12	0						▥	▤		
70	PT	13	40						▥	▤		TXUU Su = 1429 psf
	PT	14	47						▥	▤		MC = 5.9% TD = 151.3 pcf
75	PT	15	37						▥	▤		TXUU Su = 2550 psf
	PT	16	27						▥	▤		MC = 5.5% TD = 153.4 pcf
80	PT	17	87						▥	▤		MC = 7.0% TD = 153.9 pcf
85												
90												
95												
100												

Notes:
1. Boring completed at a depth of 81.8 feet on 5/17/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.

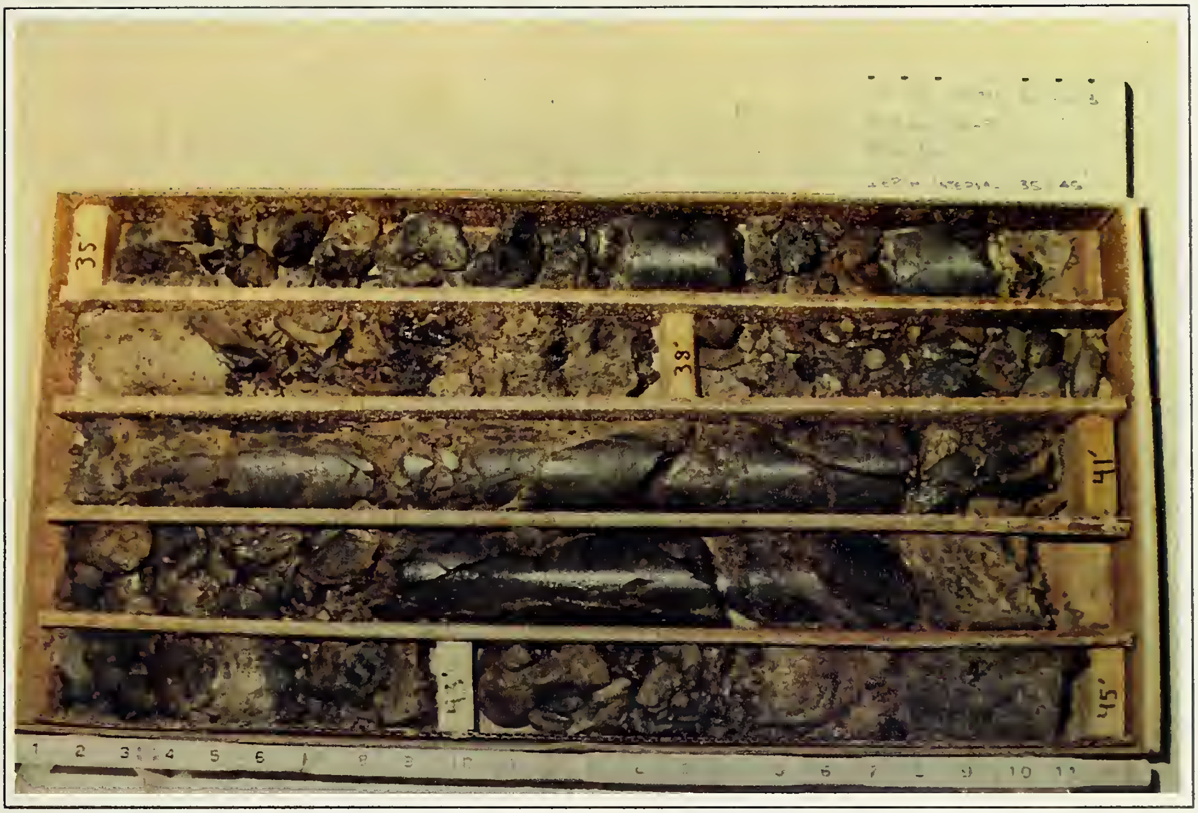
Job No: 30751-001-003
Pt. ID: CALTR / B-3

Dames & Moore, Inc.

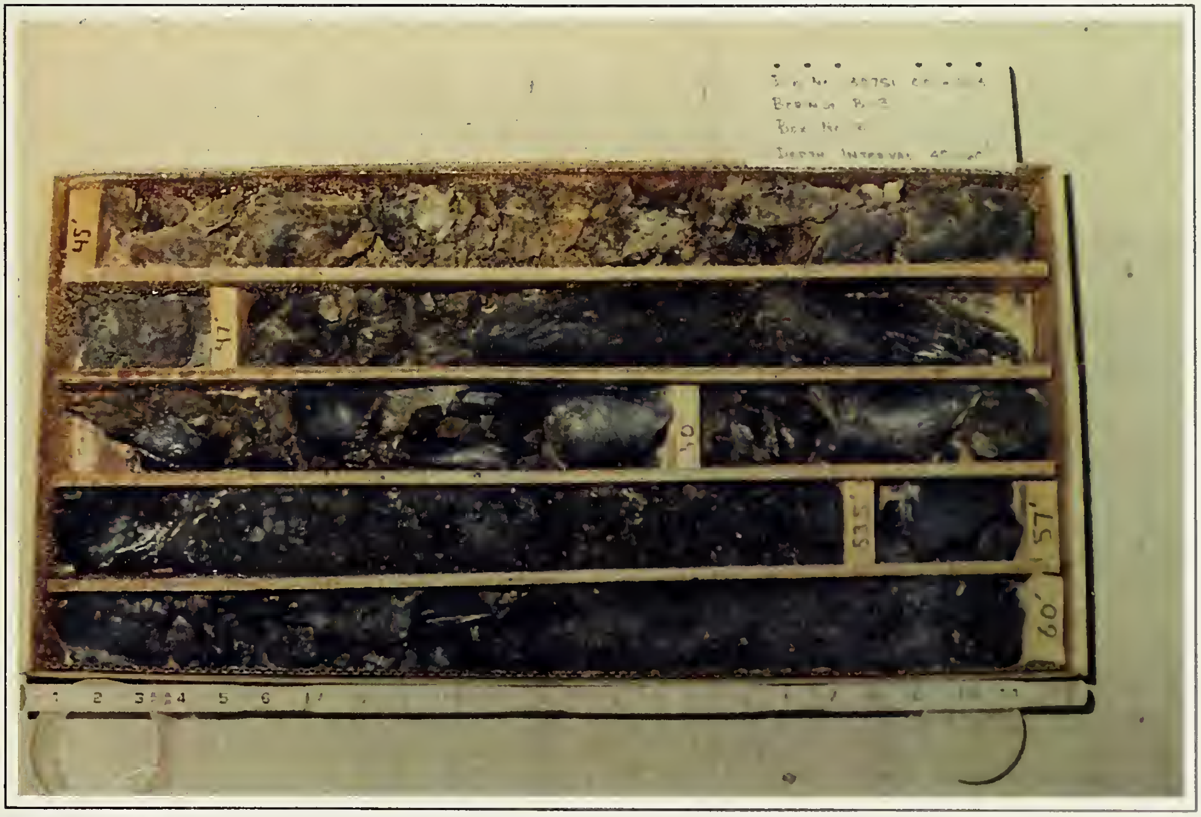
Log of Boring

Log Template: 15A

September 9, 1995



Boring No. B-3: Box No. 1, Depth Interval 35' - 45'



Boring No. B-3: Box No. 2, Depth Interval 45' - 60'

DAMES & MOORE

BORING B-4

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE		
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)						
0											SW	2-inch thick ASPHALT 10-inch thick CONCRETE SANDY GRAVEL [FILL]
											SC	BLACK GRAY CLAYEY SAND with trace gravel, moist, medium dense [FILL]
5	21						17.1	113.6	U	40		
10									SPT	3		Grades with wood chips, less fines, no gravel, trace of shell fragments, very loose
15									U	10		Grades with more fines
											CH	GRAY PLASTIC CLAY with fine sand and shell fragments [SANDY BAY MUD]
20									P	>300		Grades with some gravel
											SP	RUSTY BROWN SILTY FINE SAND, dense [UPPER SANDS WITH CLAY LENSES]
25									SPT	48		Grades to partially cemented
30	7.2			DS	1500 3000	1728 3685	23.4	128.7	U	50/5"		Grades with some nodules
												Grades coarser grained, to medium sand
35												

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-4

Dames & Moore, Inc.

Log of Boring

Date Completed: 5/31/95
Boring Depth: 135.0 ft.

Surface Elev: 5.0 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

Location:
San Francisco, Calif.

Log Template: SF1B

September 9, 1995

BORING B-4

DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE	SAMPLES	SYMBOL		DESCRIPTION
35									SPT	76	▮	⁘		
												▨	CL	BROWN SANDY LEAN CLAY with little fine gravel, wet, very stiff [STIFF CLAY]
40							16.0		SPT	31	▮	▨		
45							18.1		SPT	47	▮	▨		
												▨		Grades to gray and brown and to hard
50				TXUU	5750	4495	14.2	138.4	PT		▥	▨		
												▨		Grades to highly weathered rock
55									SPT	50/5"	▮	▨		
60														
65														
70														

Continued Next Page

BORING B-4

DEPTH IN FEET	ROCK CHARACTERIZATION: CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SYMBOL	DESCRIPTION	REMARKS
									SH ST	RUSTY BROWN SHALE AND SANDSTONE, highly weathered rock, interlayered shale and graywacke	
60	SPT										
	PT									Grades to mostly shale	
	PT										
65										Grades with clayey sheared zones	
	PT									Grades to harder rock	
	PT										
70											
	PT										
									ST	MEDIUM GRAY SANDSTONE, fine to medium grained, quartz filled fractures	
	NQ	1	0	0				30			
75											
	NQ	2	7	0	60	WS	MS	34.8			
									SH	DARK GRAY SHALE, silty, laminated, highly fractured slightly weathered, weak, quartz filled fractures	
	NQ	3	21	0	60	WS	W	30			
	NQ	4	40	0	10	WS	W	20			
80					60						
	NQ	5	68	0	10	F	W	26.2		Crushed zone 81.7' to 82.2'	
85											
	NQ	6	89	0	10	F	W	31.7			
	NQ	7	91	20	10	F	MS	27	ST	MEDIUM GRAY SANDSTONE, fine to medium grained, laminated, closely fractured, interbedded with shale	
90					5	F	MS				

Continued Next Page

BORING B-4

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SYMBOL	DESCRIPTION	REMARKS
	ROCK CHARACTERIZATION										
	NQ	8	86	10	20	F	W	20.6			
									SH	SHALE interbedded with fine grained sandstone	
					8	F	MS				
	NQ	9	100	13	60	F	VW	16.3	SL	DARK GRAY SILTSTONE, laminated, moderately fractured, fresh, moderately strong, interbedded with sandstone	
95											
					8	F	MS				
					10	F	MS			Crushed zone 95.8' to 96'	
	NQ	10	89	13	40	F	VW	17.6			
					10	F	MS			Crushed zone 99.1' to 99.3' and 100.8' to 101'	
100											
	NQ	11	69	0	40	F	W	14.8		Crushed zone 102' to 103' and 103.7' to approximately 106'	
					10	F	MS				
					60	F	VW				
105											
	NQ	12	0	0				27.2			
									SH	SHALE interbedded with sandstone	
	NQ	13	18	0	40	F	W	23.6			
110											
	NQ	14	100	0	40	F	W	22.4			
									ST	SANDSTONE interbedded with shale	
115											
	NQ	15	88	0	25	F	W	18			
									SH	SHALE interbedded with siltstone	
	NQ	16	87	0	10	F	W	26.1			
120											
					10	F	MS		ST	SANDSTONE	
									SH	SHALE interbedded with siltstone Crushed zone 122.2' to 122.8'	
	NQ	17	83	23	4	F	MS	24.5			
125											

SAMPLES

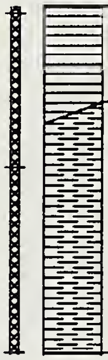
Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / B-4	**Dames & Moore, Inc.**	**Log of Boring**

Log Template: 15A

September 9, 1995

BORING B-4



DEPTH IN FEET	ROCK CHARACTERIZATION								SYMBOL	DESCRIPTION	REMARKS
	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)			
	NQ	18	100	39	7	F	MS	20			Many fractures follow bedding
					5	F	MS		SL	SILTSTONE interbedded with sandstone	
130	NQ	19	100	59	5	F	MS	22.4			
					40	F	W			Bedding dips ~45 degrees	
					5	F	MS			Sheared shale zone from 132.5' to 132.7'	
					10	F	W			Bedding dip is approximately 50 degrees	
135											
140											
145											
150											
155											
160											

Notes:

1. Boring completed at a depth of 135 feet on 5/31/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.

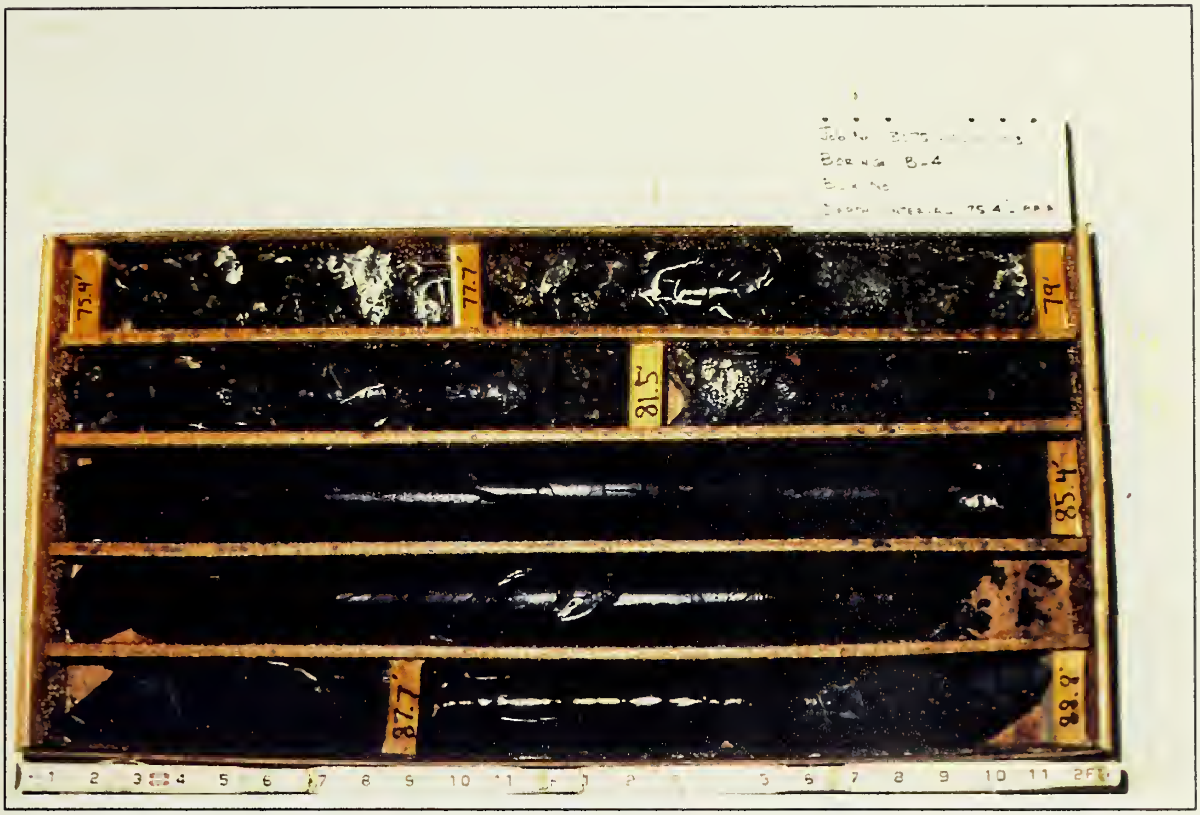
Job No: 30751-001-003
Pt. ID: CALTR / B-4

Dames & Moore, Inc.

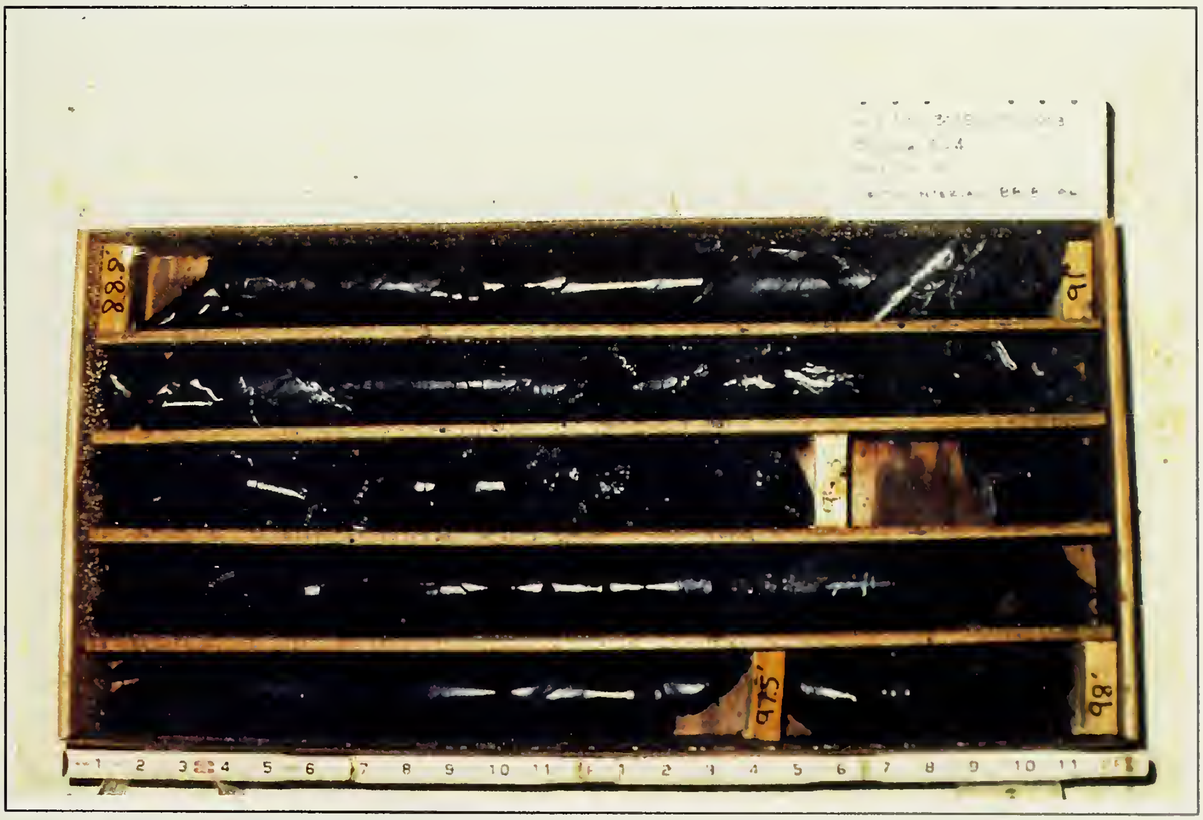
Log of Boring

Log Template: 15A

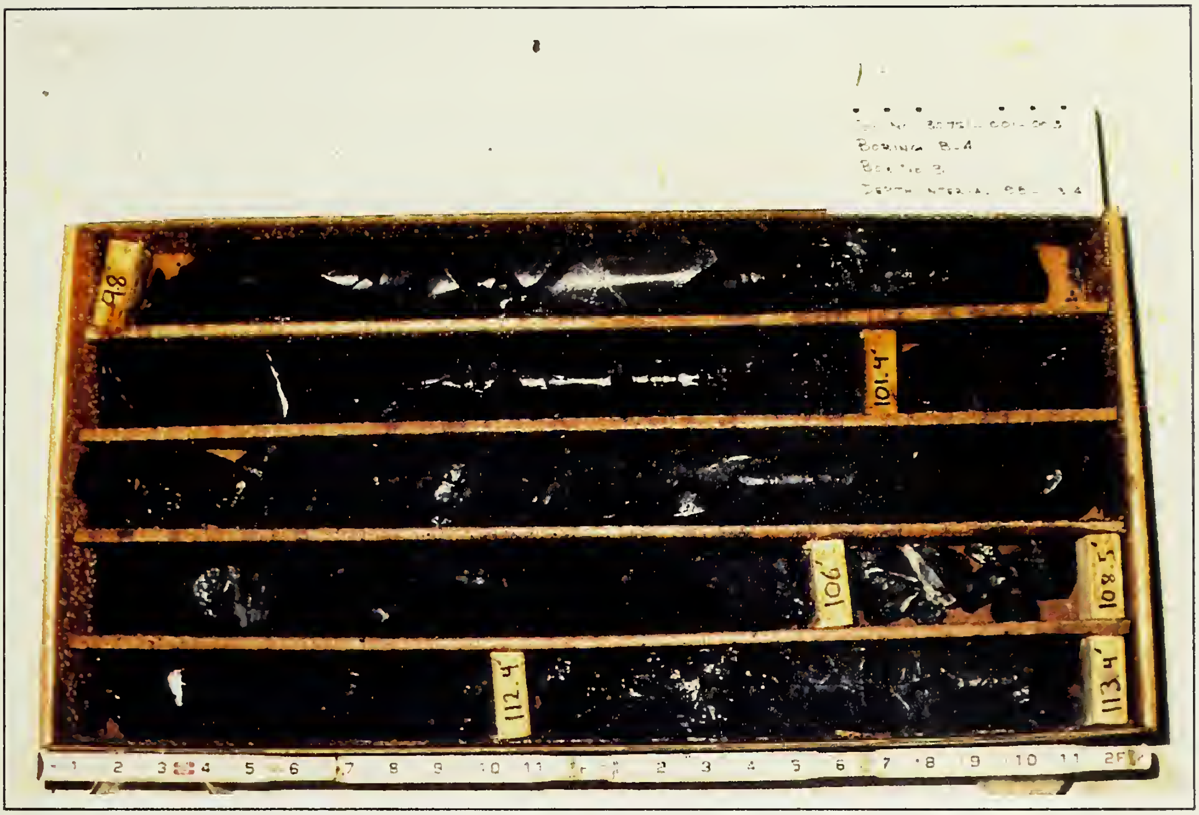
September 9, 1995



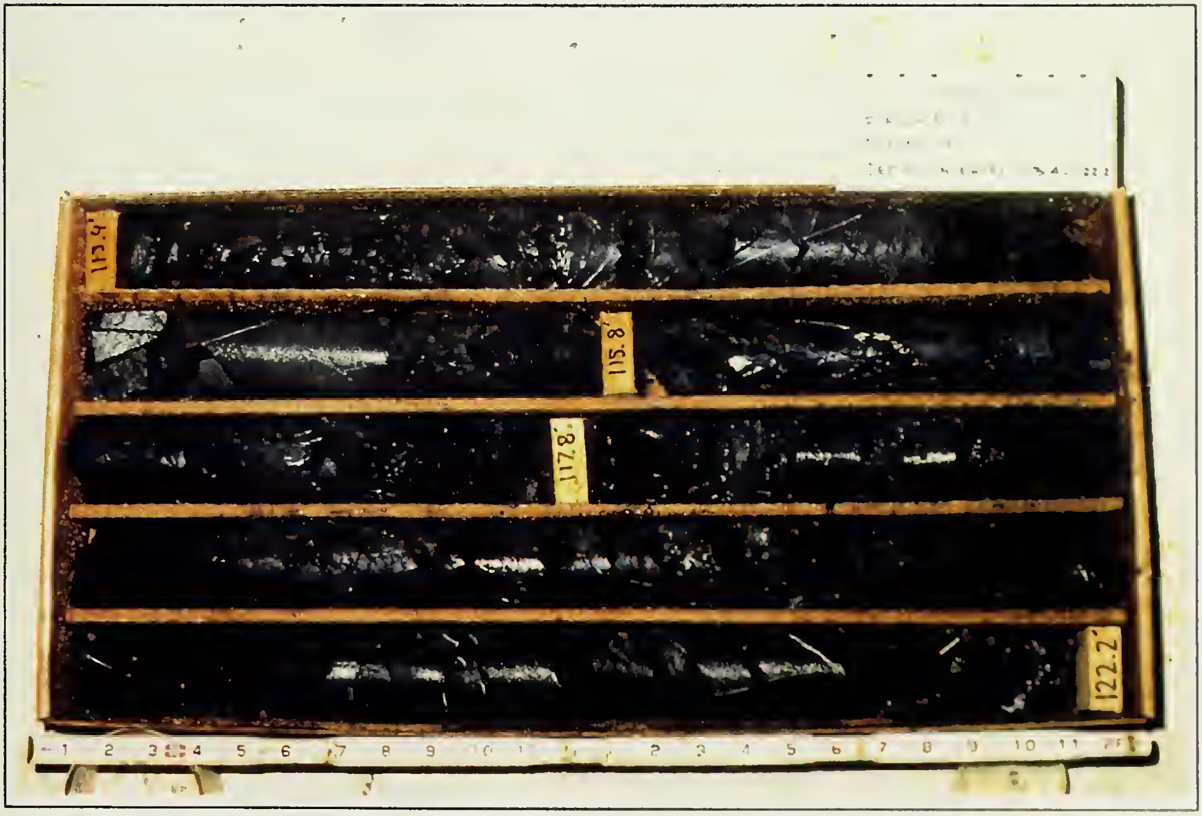
Boring No. B-4: Box No. 1, Depth Interval 75.4' - 88.8'



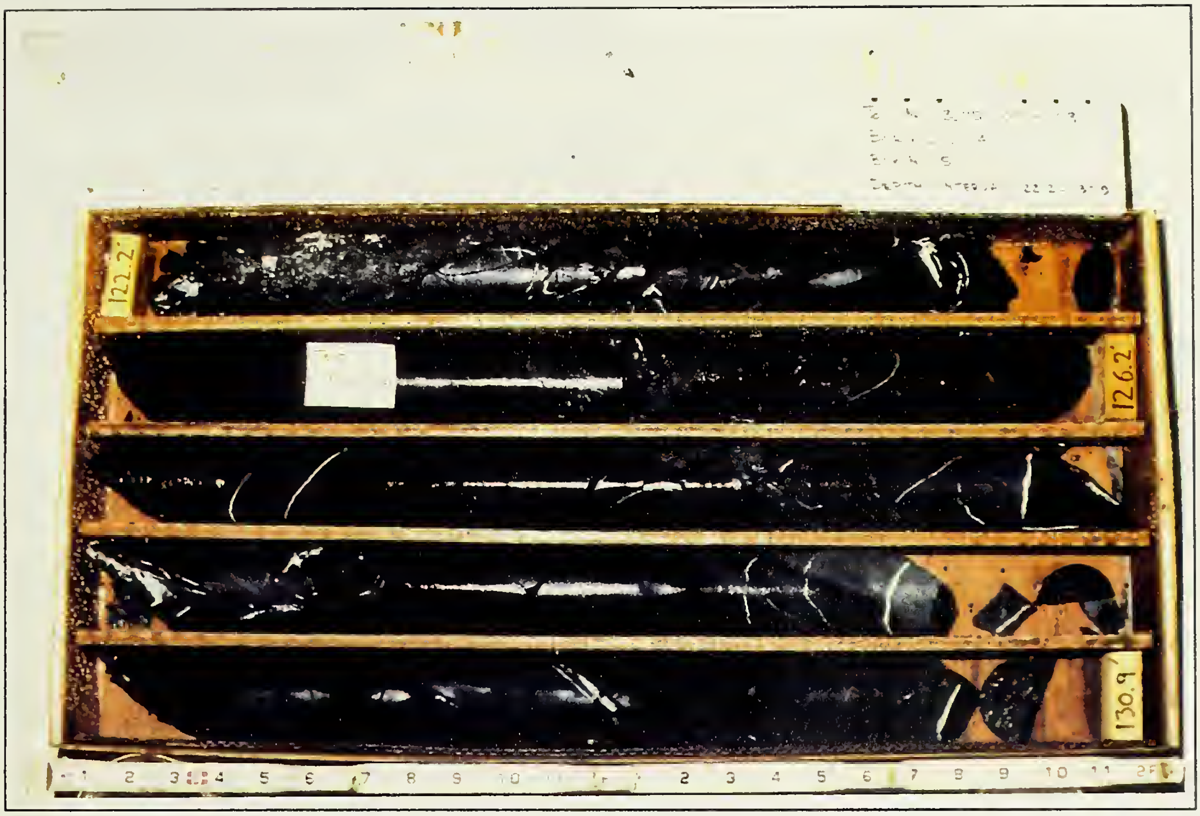
Boring No. B-4: Box No. 2, Depth Interval 88.8' - 98'



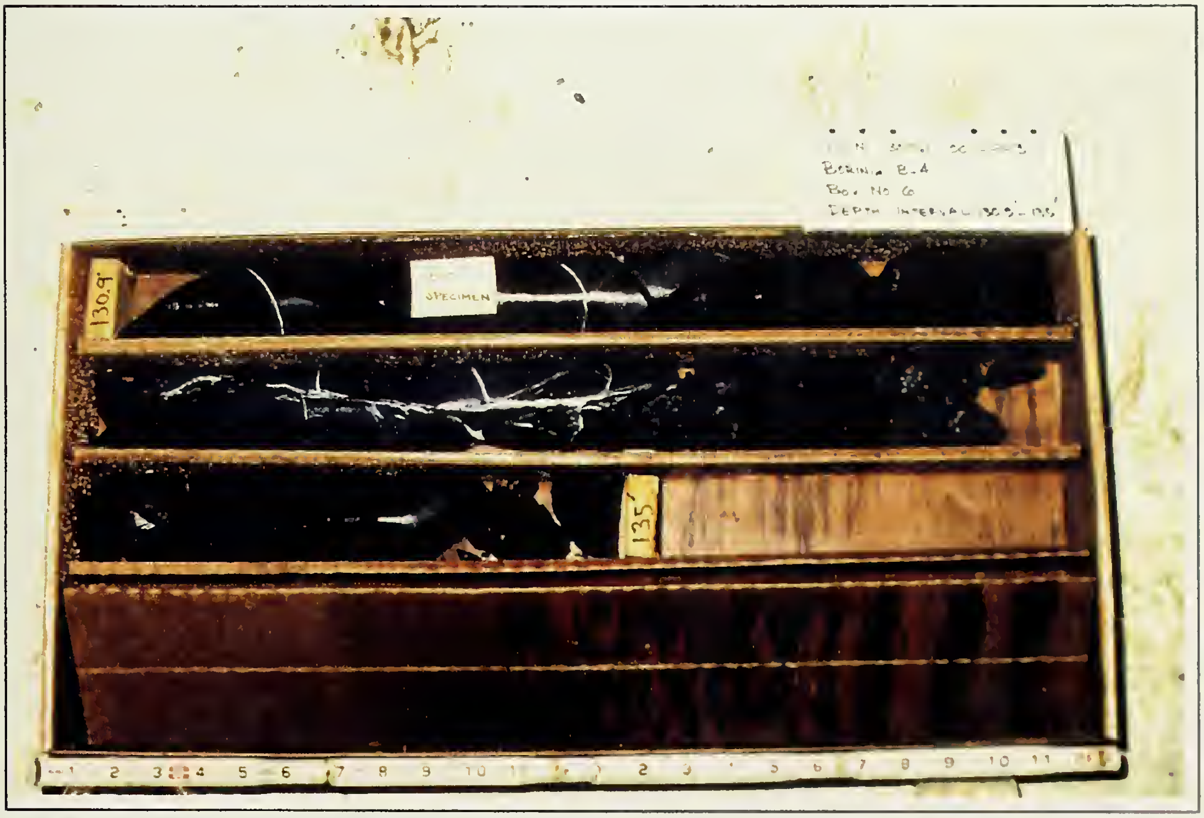
Boring No. B-4: Box No. 3, Depth Interval 98' - 113.4'



Boring No. B-4: Box No. 4, Depth Interval 113.4' - 122.2'



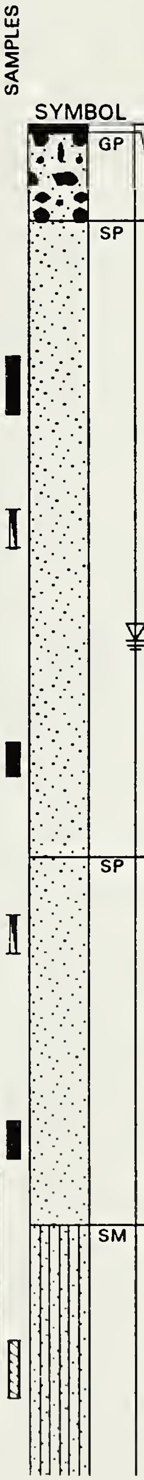
Boring No. B-4: Box No. 5, Depth Interval 122.2' - 130.9'



Boring No. B-4: Box No. 6, Depth Interval 130.9' - 135'

BORING B-5

DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE	SYMBOL	DESCRIPTION
0											GP	1-inch ASPHALT DARK BROWN GRAVEL with sand, dense, wet, grades with cobbles asphalt and concrete [FILL]
											SP	OLIVE BROWN FINE SAND with little fines, moist, medium dense [FILL]
5												
							5.3	113.7	U	34		
10									SPT	24		
15												Grades to saturated
	1.3			DS	1000 1500 2000	883 1193 1662	18.7	123.2	U	37		
											SP	GRAY FINE SAND wet, very dense [UPPER SANDS WITH CLAY LENSES] Grades with occasional well-rounded black gravel
20									SPT	62		
												Grades to clayey fine sand
25												Grades to fine sand with angular fine gravel
	4.2			DS	1500 2500 3000	2169 2169 2905	19.4	128.2	U	75		
												Grades with some shells and clayey sand lenses
											SM	OLIVE GRAY SILTY SAND with shells, saturated and traces of coarse to fine gravel, very loose
30												
	16.0			DS	1500 2500 3000	1130 1618 1202	31.8	124.2	P	150		
35												



Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / B-5	Dames & Moore, Inc.	Log of Boring
Date Completed: 5/2/95 Boring Depth: 150.5 ft.	Surface Elev: 8.3 ft. (C.C.S.F. Datum) Coordinates: Not surveyed	Location: San Francisco, Calif.

Log Template: SF1B

September 9, 1995

BORING B-5

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE		
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)						
35	5						19.0	128.8	U	100/ 9.5"	SP	**OLIVE GRAY FINE SAND** with fine gravel and coarse sand, very dense
40									SPT	66		Grades olive brown fine sand
												Grades with clay lenses
45	6.0			DS	2000 3000 4000	2179 2993 3722	22.9	125.0	U	98/9"		
												Grades to light brown with more fines with shells
											SP SM	**ORANGE-BROWN CLAYEY FINE SAND** with cementation, moist, very dense
50	12.3						22.9		SPT	53		
55							23.0	130.1	U	97/10"		
												Grades with clean fine sand layers thicker than 1 feet
60	9.7						22.1		SPT	92/11"		Grades to fine sand little to no fines
65									U	97/9"		
70												

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-5

Dames & Moore, Inc.

Log of Boring

Log Template: SF1B

September 9, 1995

BORING B-5

DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE	SYMBOL	DESCRIPTION
70									SPT	86		
75											CL	LIGHT OLIVE BROWN LEAN CLAY with black mottling
							23.9	126.7	U	73		
80									PT			
											SP SM	ORANGE BROWN FINE SAND, wet, very dense
85	25.4						15.7		SPT	94/4"		
90									SPT	93/10"		Grades to dark rust
95	8.7						22.1		SPT	85/11"		
											CH	DARK BLUE GREEN PLASTIC CLAY, wet, very stiff [OLD BAY CLAY]
100		64.9	33.8	TXUU	11000	2607	37.9	115.5	PT			
												Grades with abundant broken shell fragments Grades less stiff, to stiff, to very stiff
105												

Continued Next Page

BORING B-5

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SYMBOL	DESCRIPTION
		ATTERBERG LIMITS		STRENGTH DATA								
	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE		
105									SPT	19		
		64.6	36	TXUU	12500	3717	36.9	116.3	PT			
110												
											CL	ORANGE BROWN GRAVELLY LEAN CLAY, with fine sand and gravel, moist, very stiff [LOWER SANDS AND CLAYS]
									PT			
115												
												Grades sandier
											SC	BROWN CLAYEY FINE SAND, wet, very dense
120	29						21.5		SPT	68		
											SP	BROWN FINE SAND with little fines, wet, very dense
125									SPT	86/11"		
												Grades very slightly cemented
130	9.8						25.9	125.6	U	100/7"		
135									SPT	29	CH	GRAY PLASTIC CLAY with some gravel, wet, very stiff
140												

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-5

Dames & Moore, Inc.

Log of Boring

Log Template: SF1B

September 9, 1995

BORING B-5

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
		ATTERBERG LIMITS		STRENGTH DATA									
	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
140							17.4		SPT	70	I	▨	Grades with more gravel
												░	GRAY SANDSTONE, highly weathered, moderately strong, extremely close fractures
145									SPT	70/6"	I		
150													
155													
160													
165													
170													
175													

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-5

Dames & Moore, Inc.

Log of Boring

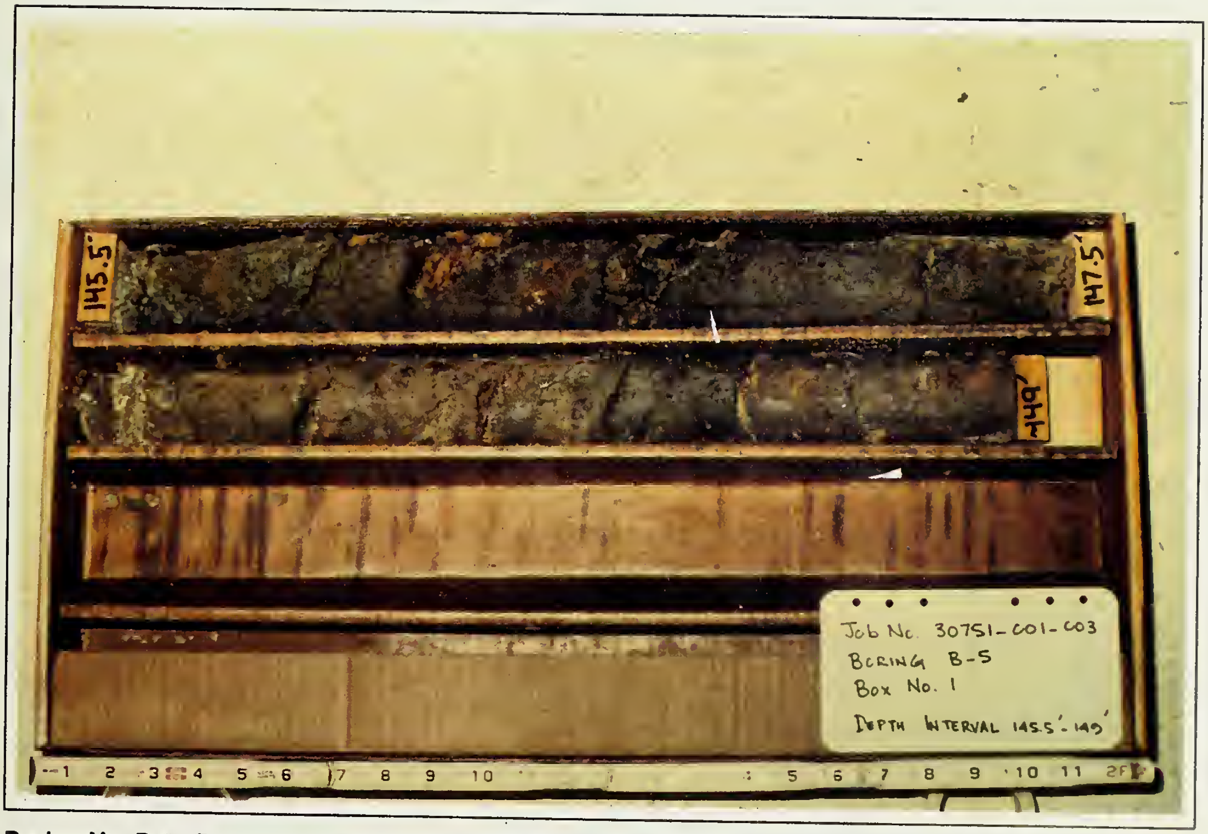
Log Template: SF1B

September 9, 1995

BORING B-5

DEPTH IN FEET	ROCK CHARACTERIZATION								SAMPLES	SYMBOL	DESCRIPTION	REMARKS
	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)				
											GRAY SANDSTONE, highly weathered, moderately strong, extremely close fractures	
145	SPT NQ	1	68	0	4	WC	W	13.6		SH	OLIVE GRAY SHALE with Orange-Brown weathering stains, completely weathered to highly weathered, closely fractured, weak	
						WH	W					
150												
155												
160												
165												
170												
175												

Notes:
1. Boring completed at a depth of 150 feet on 5/2/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches; sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.

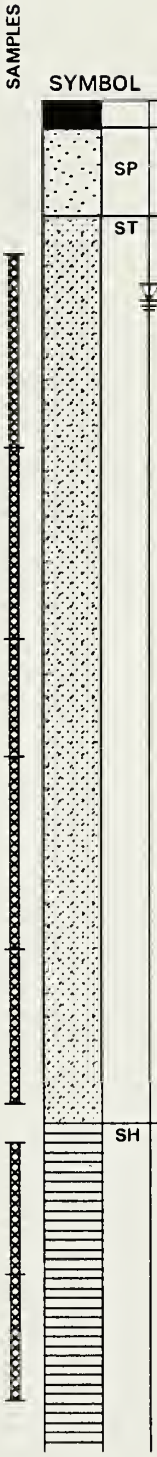


Boring No. B-5: Box No. 1, Depth Interval 145.5' - 149'

BORING B-7

ROCK CHARACTERIZATION

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
0								
	NQ	1	100	21	5	WM	MS	16.8
5								
	NQ	2	100	10	10	WM	MS	13.4
10								
					50	WH	W	
	NQ	3	100	43	5	WM	MS	19.0
15								
	NQ	4	100	48	5	WM	MS	12.4
20								
	NQ	5	80	0	15	WS	MS	19.0
					50	WS	MS	
25								
	NQ	6	100	0	60	WM	VW	11.5
					10	WS	W	
30								
	NQ	7	90	0	50	WM	VW	12.0
35								



SYMBOL	DESCRIPTION	REMARKS
	8-inch thick concrete	
SP	BROWN FINE SAND, moist, dense [FILL]	
ST	OLIVE GRAY SANDSTONE, weathered to yellowish brown, fine to medium grained, closely spaced fractures, quartz filled fractures, locally sheared, moderately weathered, moderately strong, locally weak where sheared or intensely fractured Crushed zone 11.3' to 12.5' Highly fractured zone 21.9' to 24' Crushed to intensely fractured zone 24.0' to 25.2', shaley interbeds	
SH	DARK GRAY SHALE, crushed to closely fractured, sheared, highly weathered to clay where sheared, weak, very weak where sheared and crushed Crushed and weathered zone 26.6' to 28.4'	LL = 27.2 PI = 12.2

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-7

Date Completed: 5/5/95
Boring Depth: 54.0 ft.

Dames & Moore, Inc.

Surface Elev: 10.0 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

Log of Boring

Location:
San Francisco, Calif.

Log Template: 15B

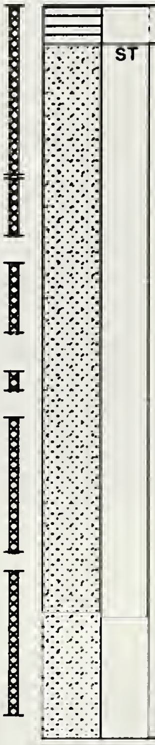
September 9, 1995

BORING B-7

ROCK CHARACTERIZATION

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
35	NQ	8	99	37	50	WS	VW	14.7
					1	F	VS	
40	NQ	9	68	0	20	F	MS	25.0
	NQ	10	65	0	10	F	MS	17.9
45	NQ	11	42	0	10	F	MS	26.7
	NQ	12	88	0	10	F	MS	11.0
					60	F	VW	
50	NQ	13	85	52	2	F	VS	9.8
55								
60								
65								
70								

SAMPLES | SYMBOL | DESCRIPTION | REMARKS



SANDSTONE

Intensely fractured zone 38.8' to 42'

Grades to dark gray, very fine grained, locally interbedded with shale

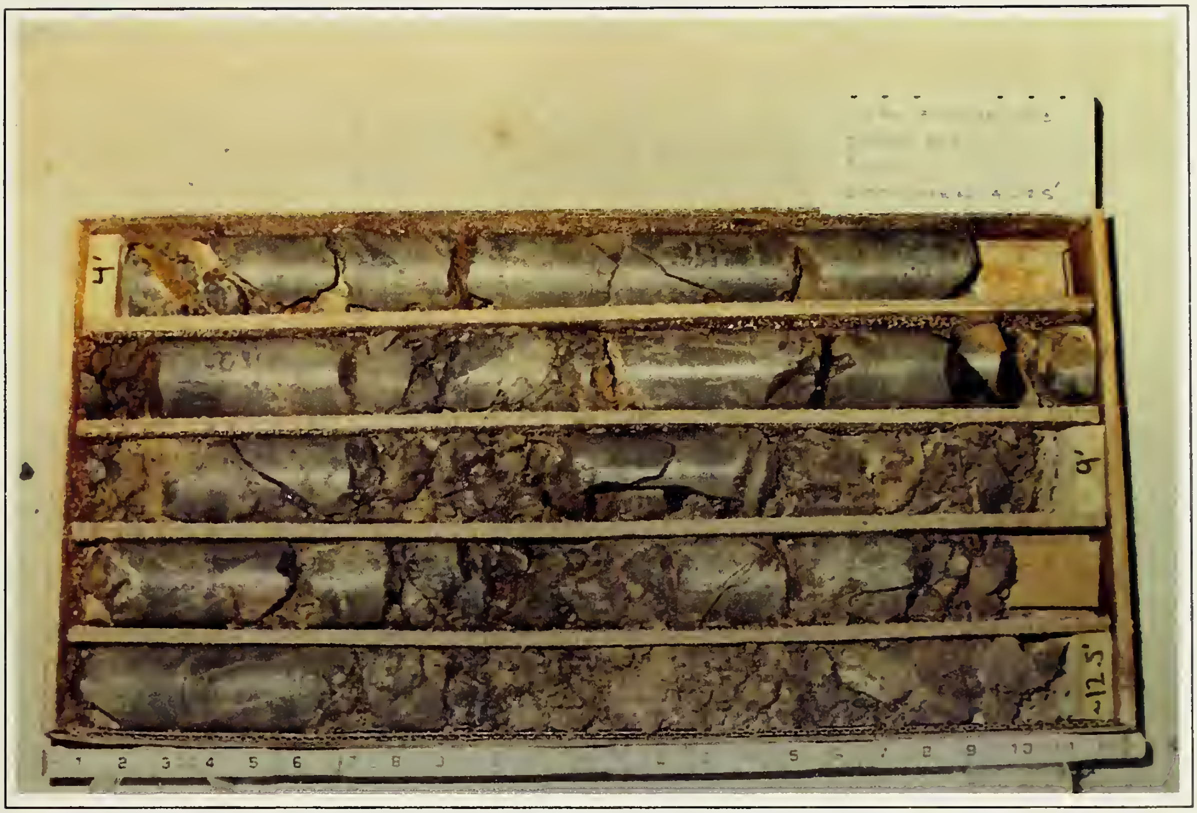
Crushed and sheared shale zone 45.9' to 46.6'

Crushed and sheared shale zone 48.1' to 50.8'

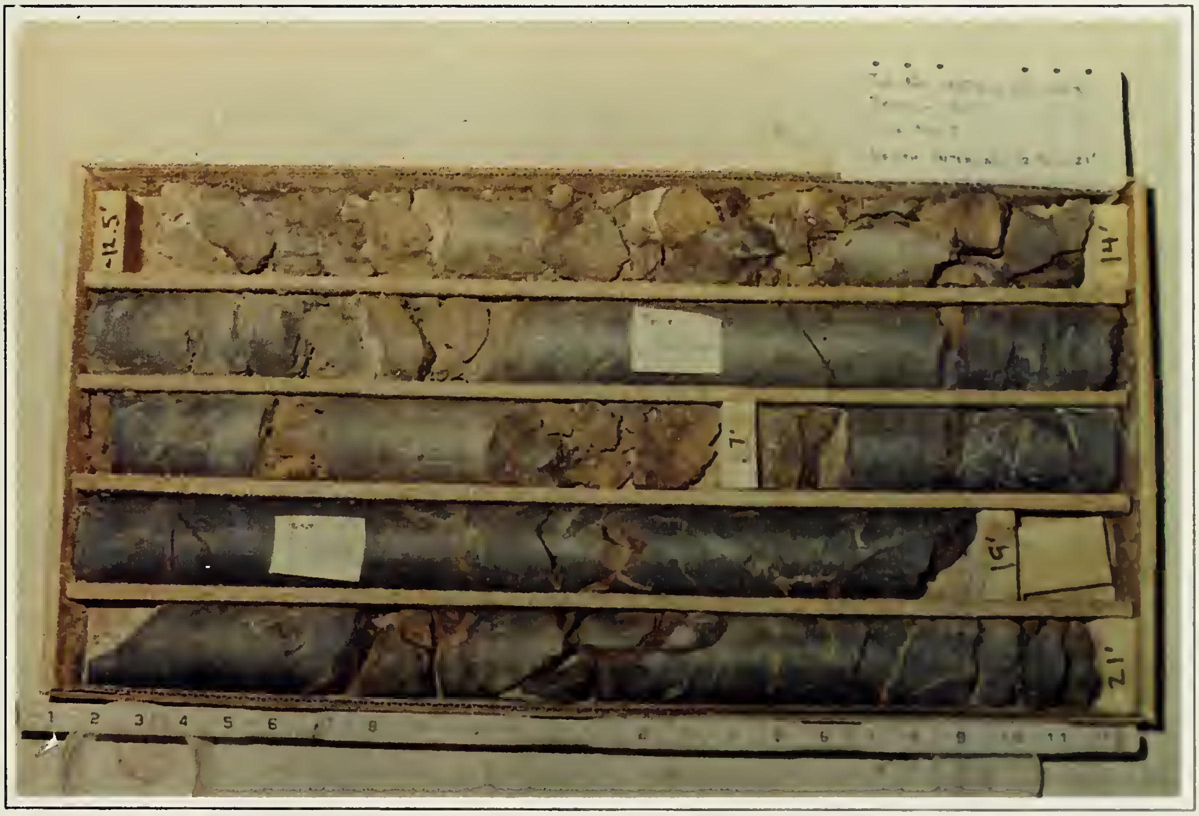
LL = 20.3
PI = 5.8

LL = 22.3
PI = 8.3

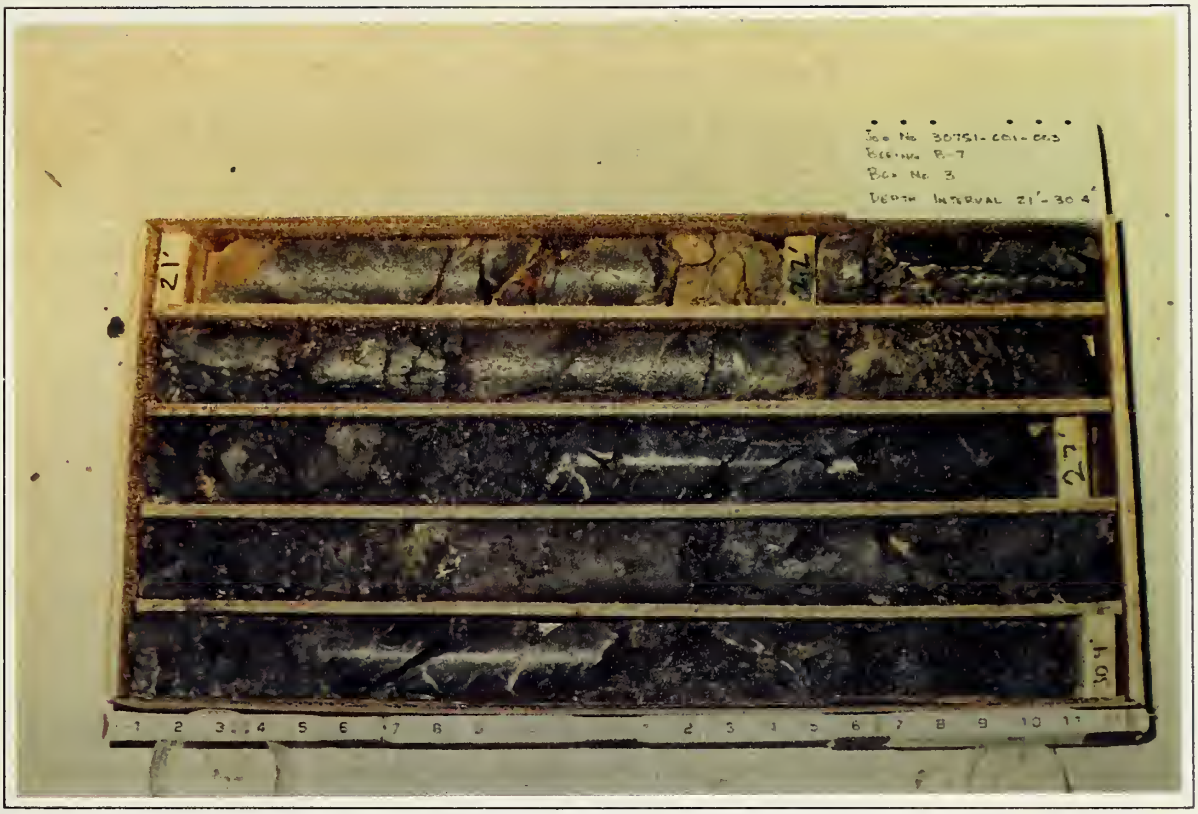
Notes:
1. Boring completed at a depth of 54 feet on 5/5/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.



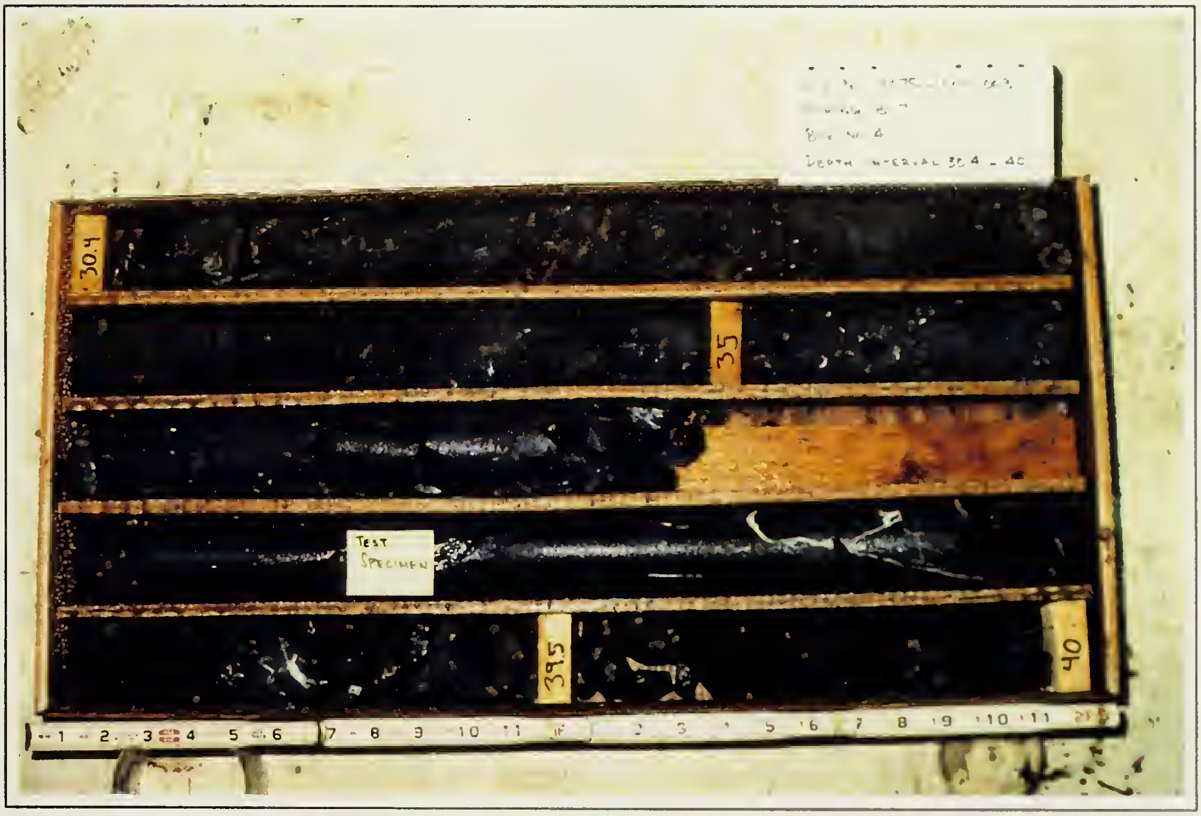
Boring No. B-7: Box No. 1, Depth Interval 4' - 12.5'



Boring No. B-7: Box No. 2, Depth Interval 12.5' - 21'



Boring No. B-7: Box No. 3, Depth Interval 21' - 30.4'



Boring No. B-7: Box No. 4, Depth Interval 30.4' - 40'

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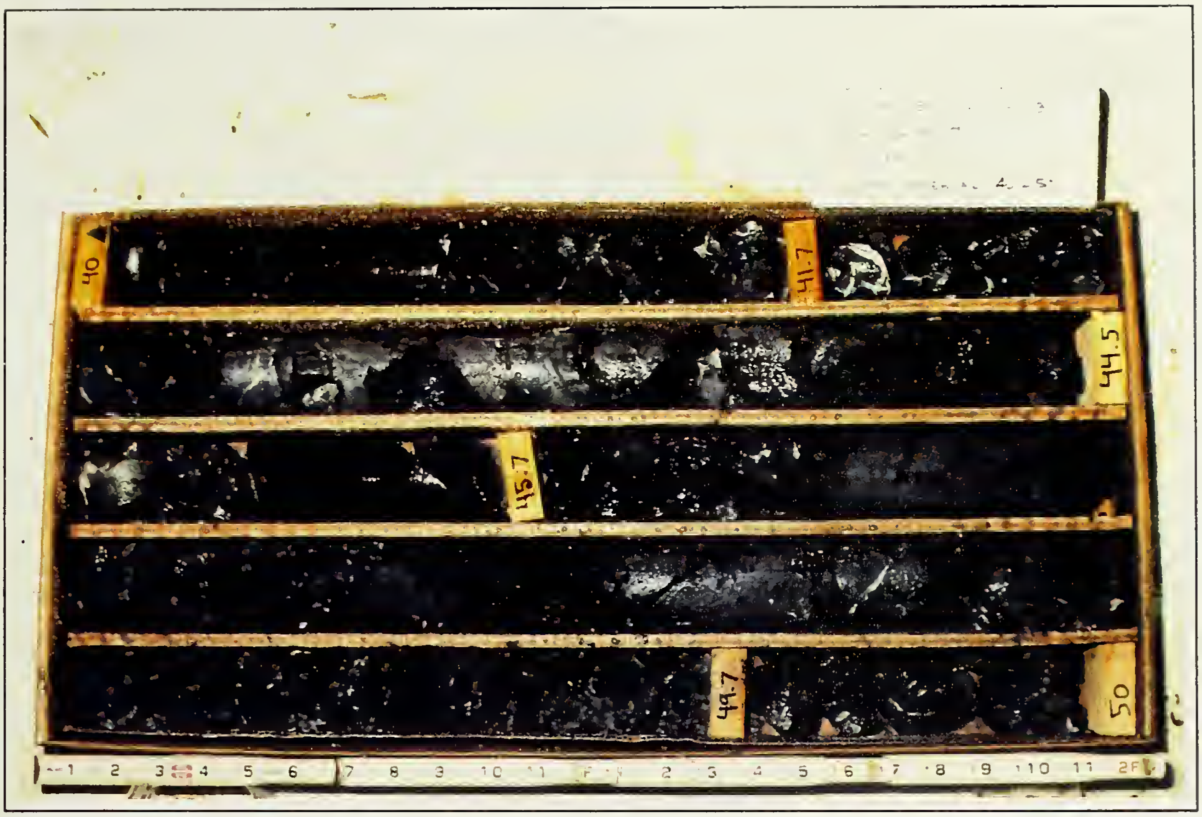
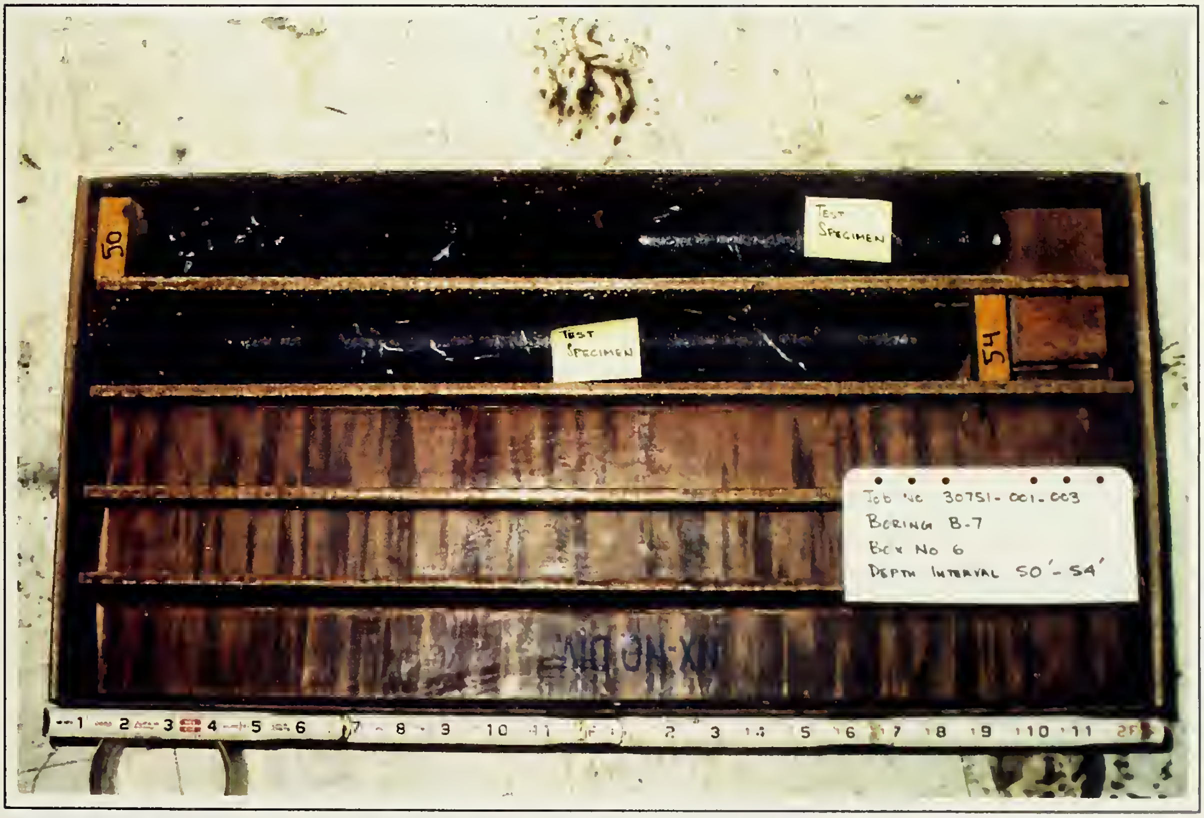
PLATE A-7 (cont.)



Boring No. B-7: Box No. 5, Depth Interval 40' - 50'



Boring No. B-7: Box No. 6, Depth Interval 50' - 54'

BORING B-8

DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE
0										
5							15.8	130.3	U	45
10									SPT	38
15	16.8			DS	1000 2000	1064 1584	16.8	133.1	U	87/10"
20	46.6						8.5		SPT	36
25										
30										
35										

SYMBOL	DESCRIPTION
	1.5-inch thick ASPHALT
SC	7-inch thick CONCRETE GRAY ORANGE CLAYEY FINE SAND, medium dense, moist [FILL]
SP	ORANGE BROWN SILTY FINE SAND, dense, moist [FILL]
SM	3-inch thick CONCRETE BASEMENT SLAB BROWN SILTY SAND, wet Grades with some fine gravel
SC	SANDY CLAY with gravel Faint hydrocarbon odor

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-8

Dames & Moore, Inc.

Log of Boring

Date Completed: 5/23/95
Boring Depth: 98.4 ft.

Surface Elev: 50.0 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

Location:
San Francisco, Calif.

Log Template: SF1B

September 9, 1995

BORING B-8

ROCK CHARACTERIZATION

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
	PT		67					
25								
	PT		53					
	PT		60					
30								
	PT		67					
	PT		70					
35								
	PT		47					
	PT		50					
40								
	PT		93					
	NQ	1	83	0	10	WS	MS	13.3
45								
	NQ	2	100	22	10	WM	MS	19.6
	NQ	3	83	0	60	WH	W	15
50								
	NQ	4	94	0	20	WM	MS	12.1
					50	WH	W	
					10	WM	MS	
55								
	NQ	5	100	19	5	WM	MS	17.5

SYMBOL	DESCRIPTION	REMARKS
ST	ORANGE BROWN CLAYEY SANDSTONE, highly weathered with close fracturing and abundant shear zones, weak	
		TXUU Su = 2178 psf MC = 9.0 % TD = 138.0 pcf
		TXUU Su = 4132 psf MC = 8.7 % TD = 140.1 pcf
		MC = 7.8 % TD = 139.8 pcf
		TXUU Su = 4035 psf MC = 10.6 % TD = 136.8 pcf
	Grades to less sheared and harder	
		TXUU Su = 3603 psf MC = 8.9 % TD = 139.2 pcf
		Switch to NQ coring
ST	OLIVE GRAY YELLOWISH BROWN SANDSTONE, medium to fine grained with crushed or sheared zones, moderately weathered, highly weathered along crushed/sheared zones, locally interbedded with dark gray shale	
	Crushed zone 52' to 52.4'	
	Crushed zone 54' to 54.6'	

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-8

Dames & Moore, Inc.

Log of Boring

Log Template: 15A

September 9, 1995

BORING B-8

DEPTH IN FEET	ROCK CHARACTERIZATION: CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SAMPLES	SYMBOL	DESCRIPTION	REMARKS
	NQ	6	100	0	5	WS	MS	18.0			Quartz filled fractures	
60												
					60	WH	VW			SH	DARK GRAY SHALE, moderately fractured with local crushed zones, moderately weathered, primarily long fractures	
	NQ	7	75	21	12	WS	MS	22.5				
					60	WS	VW				Crushed zone 63.3' to 63.5'	
65												
	NQ	8	100	10	4	WS	MS	12.8		ST	SANDSTONE	
					10	WS	MS					
70												
	NQ	9	80	0	20	WS	MS	14.2				
											Crushed zone 72.1' to 72.3'	
					30	WH	VW					
75	NQ	10	80	0	20	WS	MS	13.1			Crushed zone 75' to 75.5'	
					50	WS	MS					
80	NQ	11	72	9	15	WS	MS	15				
					10	F	MS			SL	DARK GRAY SILTSTONE, sandy, closely fractured, fresh, moderately strong	
85	NQ	12	100	38	5	F	MS	11.6		ST	MEDIUM GRAY SANDSTONE, with clay matrix (graywacke), locally interbedded with dark gray shale	
					10	F	MS					
90	NQ	13	62	0	5	F	MS	14.9				
										SH	SHALE	

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-8

Dames & Moore, Inc.

Log of Boring

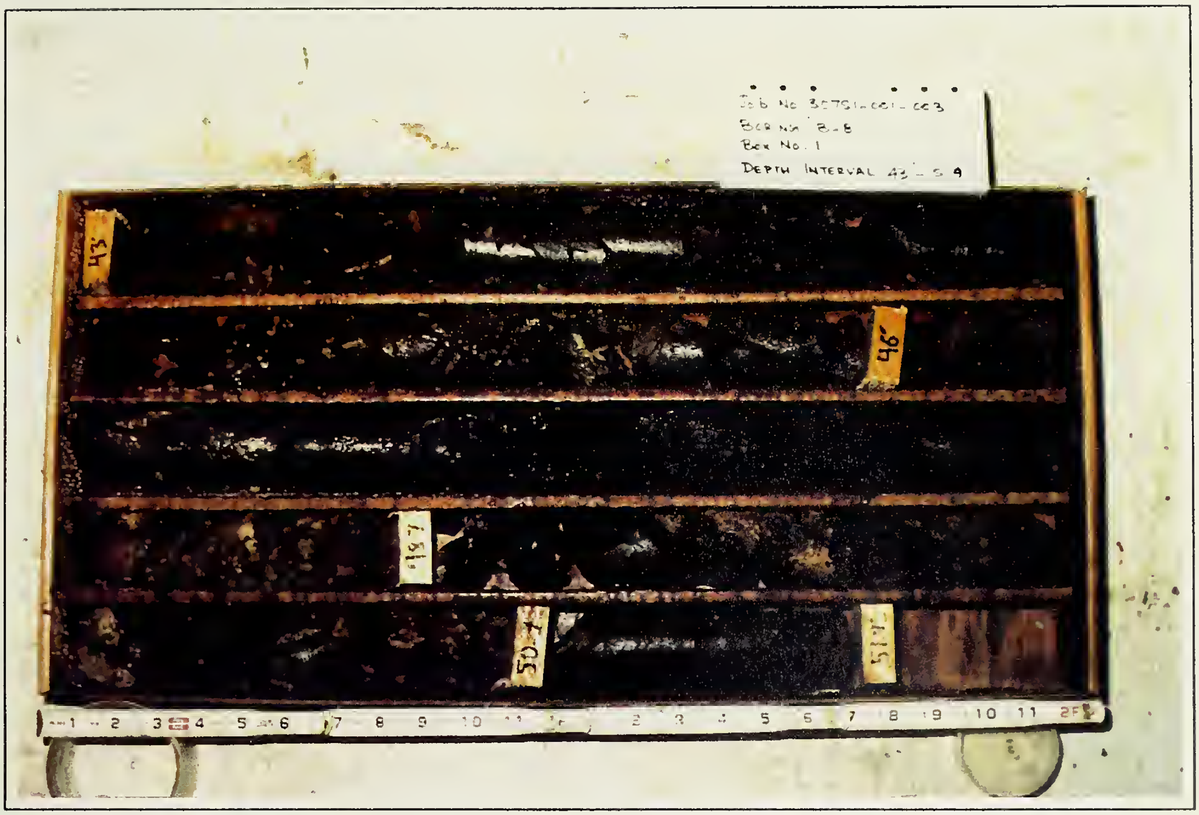
Log Template: 15A

September 9, 1995

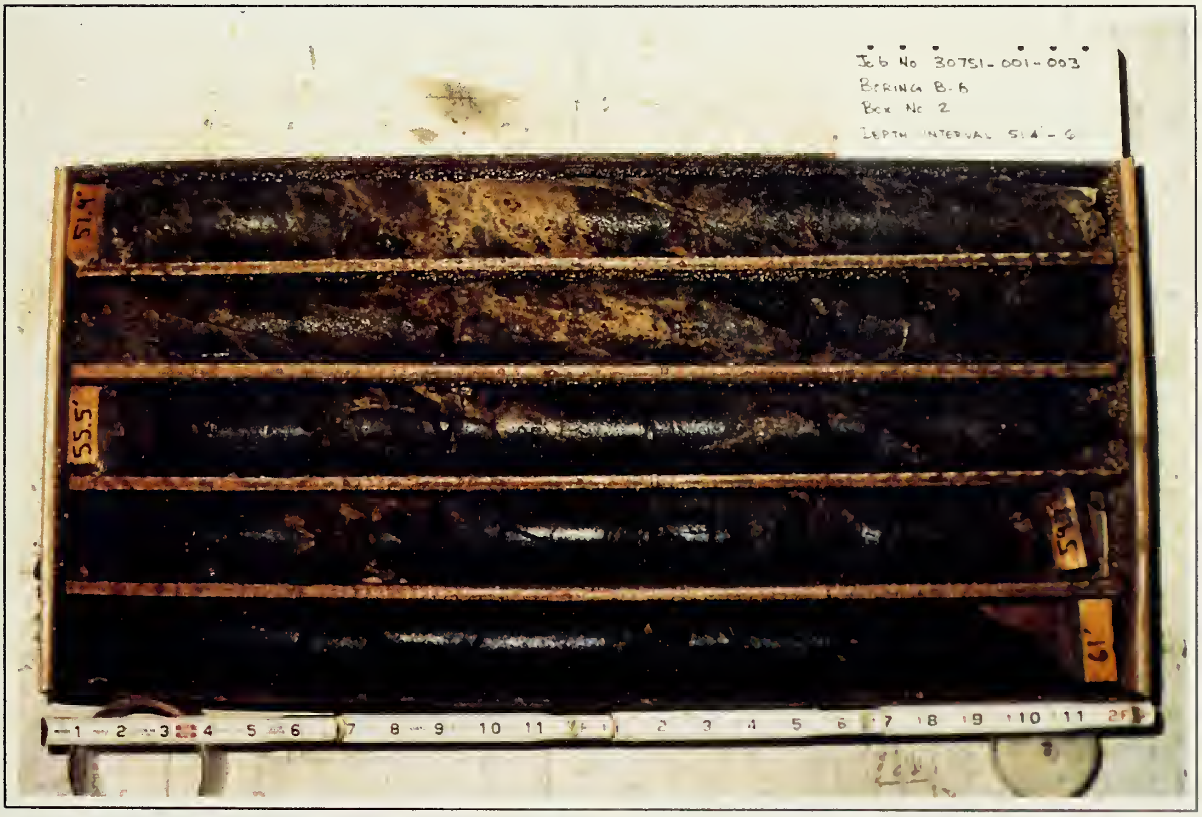
BORING B-8

DEPTH IN FEET	ROCK CHARACTERIZATION: CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SAMPLES	SYMBOL	DESCRIPTION	REMARKS
	NQ	14	77	48	5	F	MS	11.4		ST	SANDSTONE	
95					50	F	W			SH	SHALE Crushed zone 96.4' to 97.2'	
100												
105												
110												
115												
120												
125												

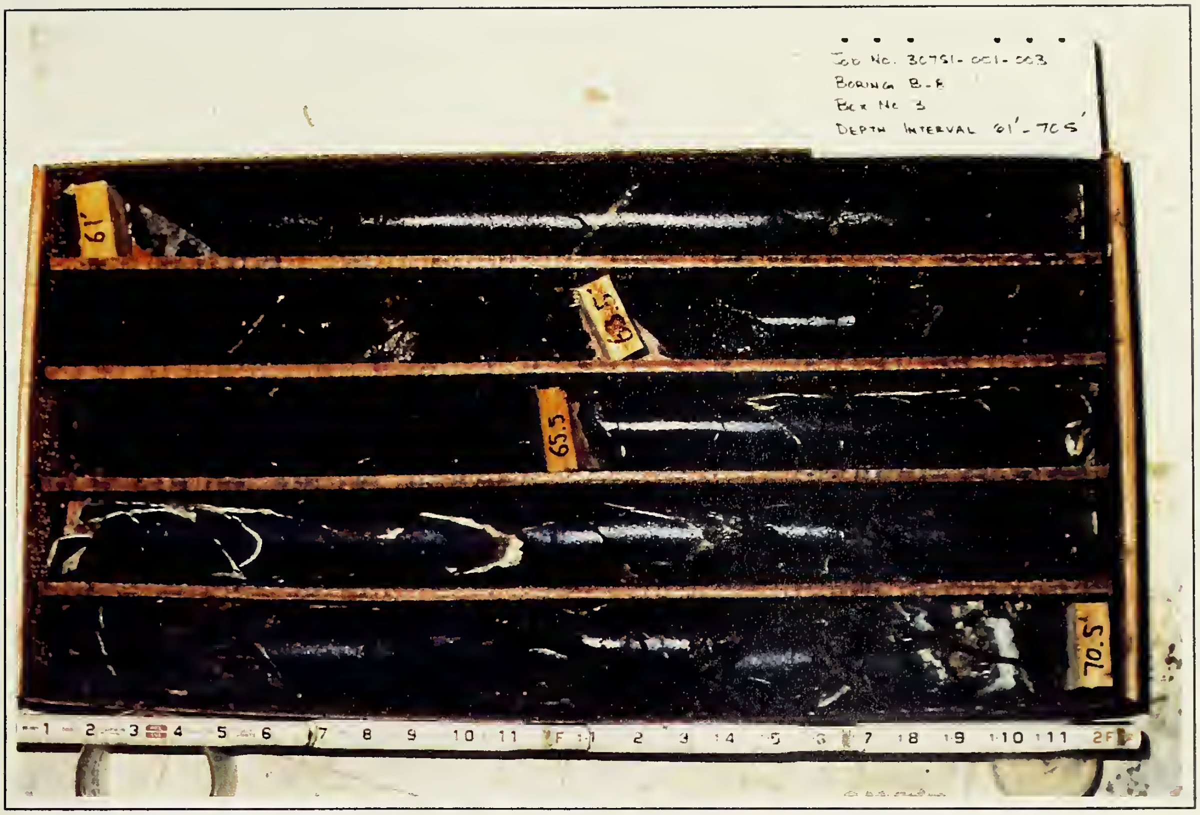
Notes:
1. Boring completed at a depth of 98.4 feet on 5/23/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.



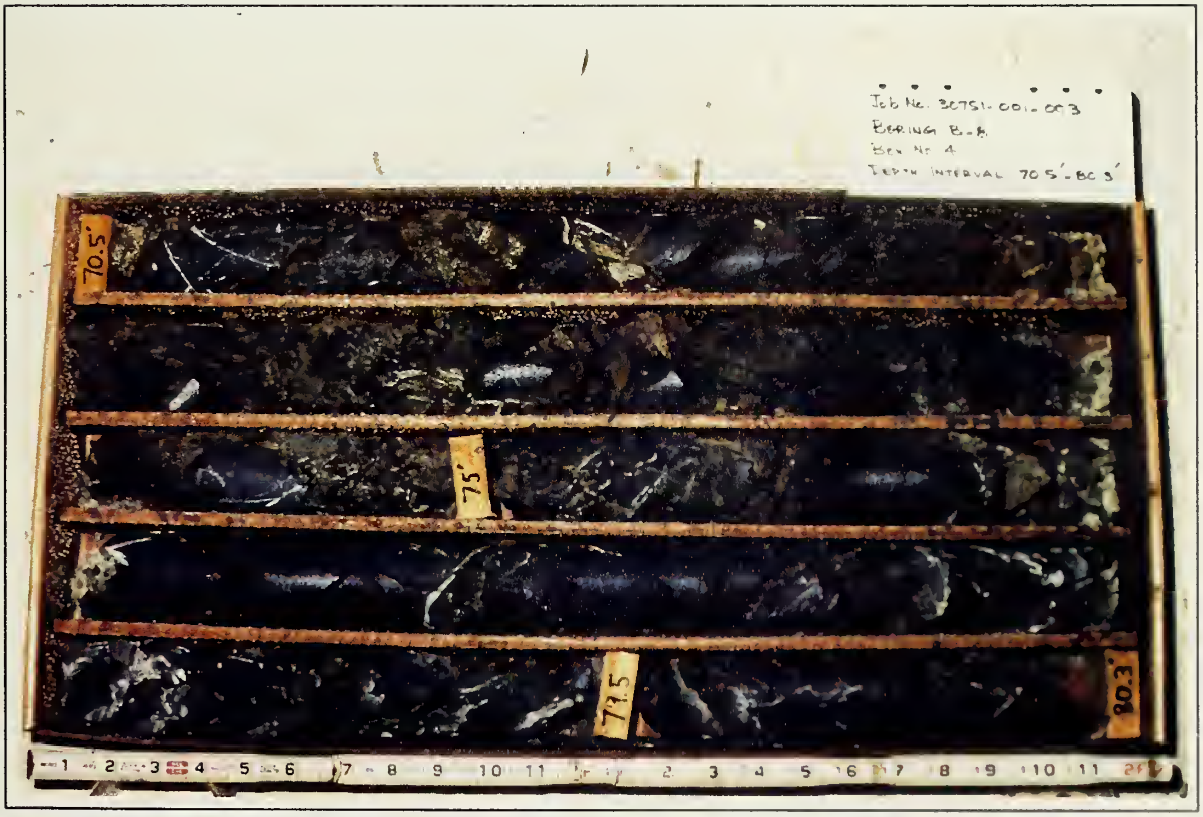
Boring No. B-8: Box No. 1, Depth Interval 43' - 51.4'



Boring No. B-8: Box No. 2, Depth Interval 51.4' - 61'



Boring No. B-8: Box No. 3, Depth Interval 61' - 70.5'



Boring No. B-8: Box No. 4, Depth Interval 70.5' - 80.3'

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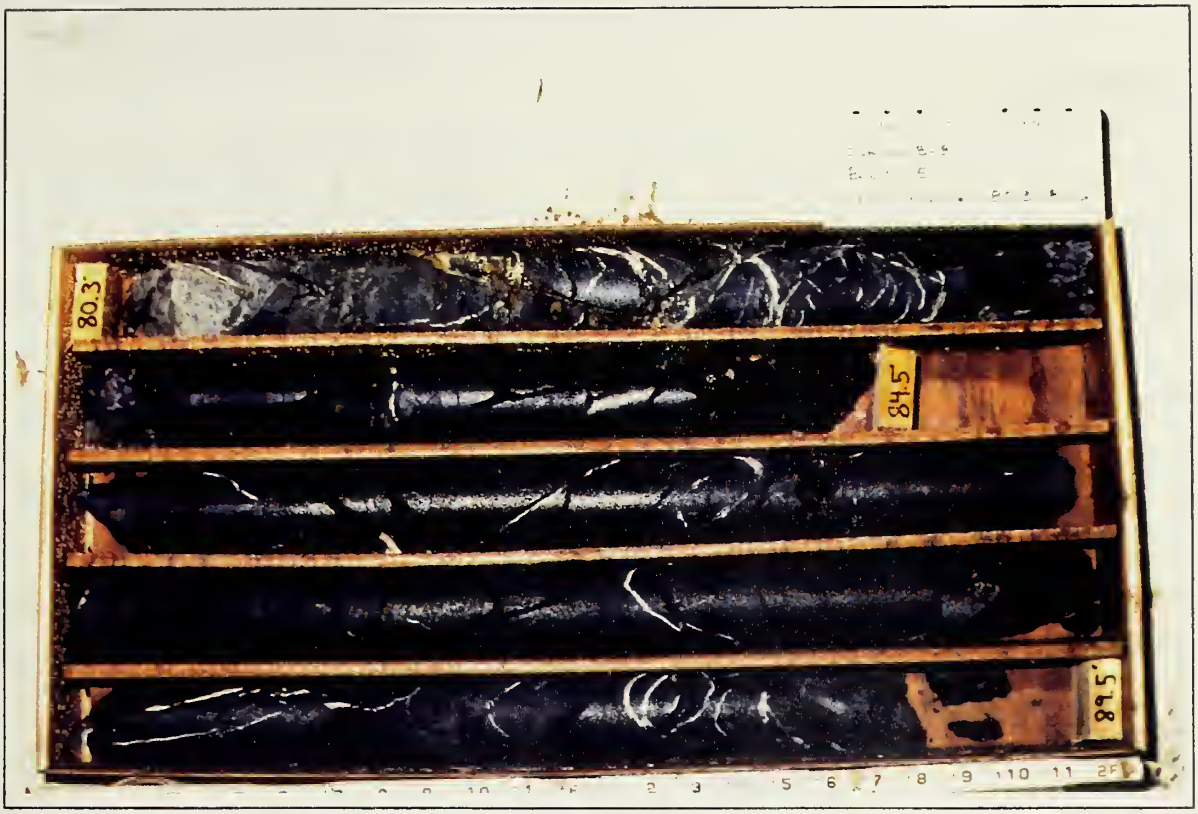
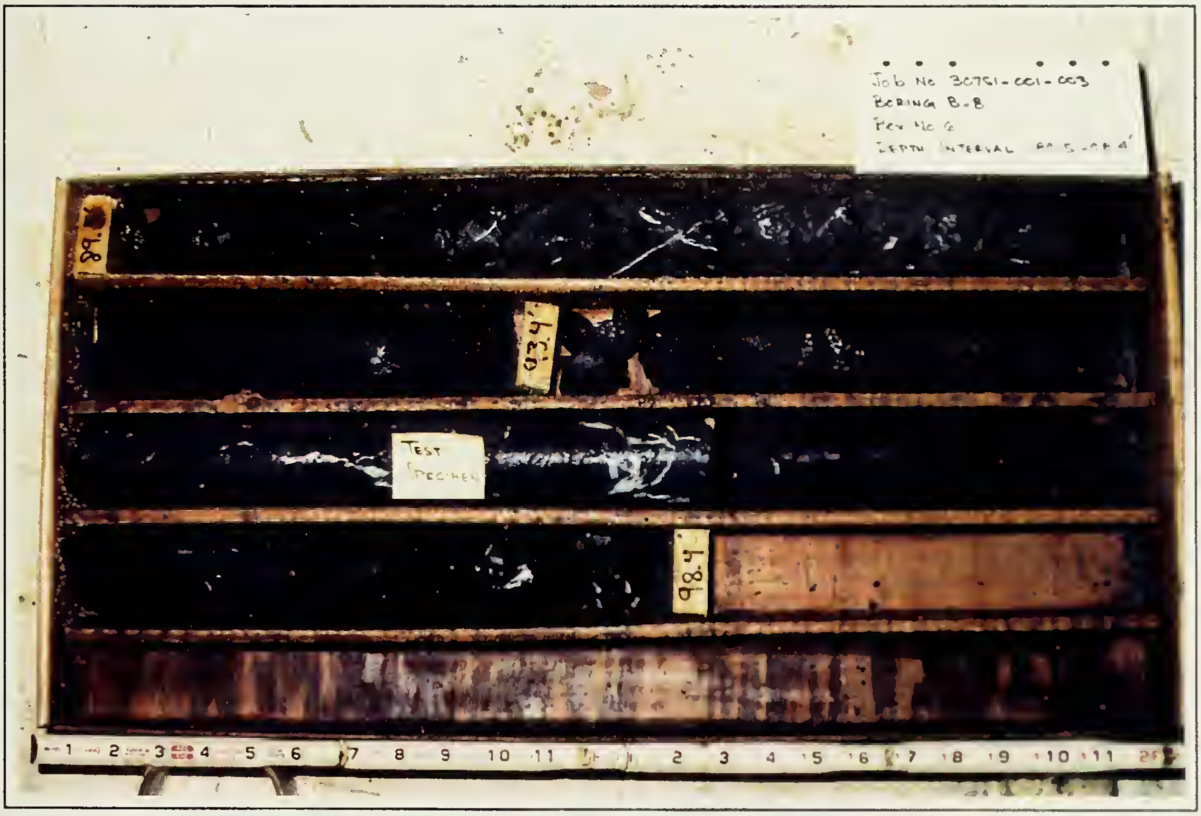
PLATE A-8 (cont.)



Boring No. B-8: Box No. 5, Depth Interval 80.3' - 89.5'



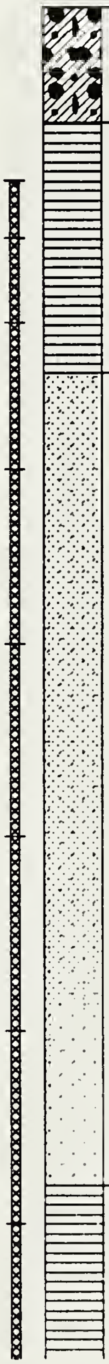
Boring No. B-8: Box No. 6, Depth Interval 89.5' - 98.4'

BORING B-9

ROCK CHARACTERIZATION

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
0								
5	NQ	1	100	0	10	WH	VW	19.3
	NQ	2	100	0	10	WH	W	20
	NQ	3	100	60	2	WM	MS	15.8
10								
	NQ	4	100	100	2	WM	MS	20.2
15								
	NQ	5	100	99	2	WS	MS	14.0
20								
	NQ	6	100	100	2	WS	MS	14.8
25								
	NQ	7	100	75	2	WS	MS	14.2
30								
	NQ	8	100	40	5	WS	W	13.4
35								

SAMPLES



SYMBOL	DESCRIPTION	REMARKS
GC	BROWN CLAYEY GRAVEL	
SH	DARK GRAY SHALE, highly sheared and fractured, heavily weathered, closely fractured to crushed, weak to very weak, locally interbedded with sandstone	
ST	MEDIUM GRAY SANDSTONE, medium grained, moderately fractured, slightly weathered primarily along fractures, very strong, numerous quartz-filled fractures	
SH	SHALE, interbedded with sandstone	

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / B-9	**Dames & Moore, Inc.**	**Log of Boring**
Date Completed: 6/2/95 Boring Depth: 77.5 ft.	Surface Elev: 60.0 ft. (C.C.S.F. Datum) Coordinates: Not surveyed	Location: San Francisco, Calif.

Log Template: 15B

BORING B-9

DEPTH IN FEET	ROCK CHARACTERIZATION CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SYMBOL	DESCRIPTION	REMARKS
35											
	NQ	9	90	0	20	WS	W	20.3	ST	SANDSTONE	
									SH	SHALE, highly sheared and foliated, bedding dips ~45 degrees, containing small blocks of sandstone Crushed zone 37.6' to 38'	
40											
	NQ	10	100	0	5	F	W	21.9			
	NQ	11	98	0	5	F	W	25.2			
45											
	NQ	12	87	0	5	F	W	22.5			LL = 26.6% PI = 10.2%
	NQ	13	100	0	5	F	W	17.1			
50	NQ	14	83	0	5	F	W	14.4			
	NQ	15	100	0	5	F	W	21.7			
55					50	F	VW			Crushed zone 54.7' to 56.2'	
	NQ	16	91	0	5	F	W	20.9		Locally contains serpentine in sheared shale matrix 55.5' to 69.7' Small blocks (0.1" - 0.5") in sheared shale matrix 56.2' to 61.2'	LL = 33.2% PI = 16.7%
	NQ	17	100	0	5	F	W	23.2			
60											
	NQ	18	100	0	5	F	W	22.0			LL = 31.2% PI = 14.3%
	NQ	19	100	0	50	F	VW	20.8			
65										Crushed zone 65.2' to 66.9'	
	NQ	20	100	0	8	F	W	18.7			
	NQ	21	100	0	8	F	W	16.8			
70											

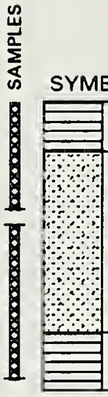
SAMPLES

Continued Next Page

BORING B-9

ROCK CHARACTERIZATION

DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
70		22	100	0	5	F	W	16.8
					5	F	VS	
	NQ	23	91	11	5	F	VS	15.9
75								
					50	F	W	
80								
85								
90								
95								
100								
105								



SYMBOL	DESCRIPTION	REMARKS
ST	SANDSTONE, locally interbedded with shale	
SH	SHALE, locally mixed with sandstone, sheared and crushed	

Notes:
1. Boring completed at a depth of 77.5 feet on 6/2/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.

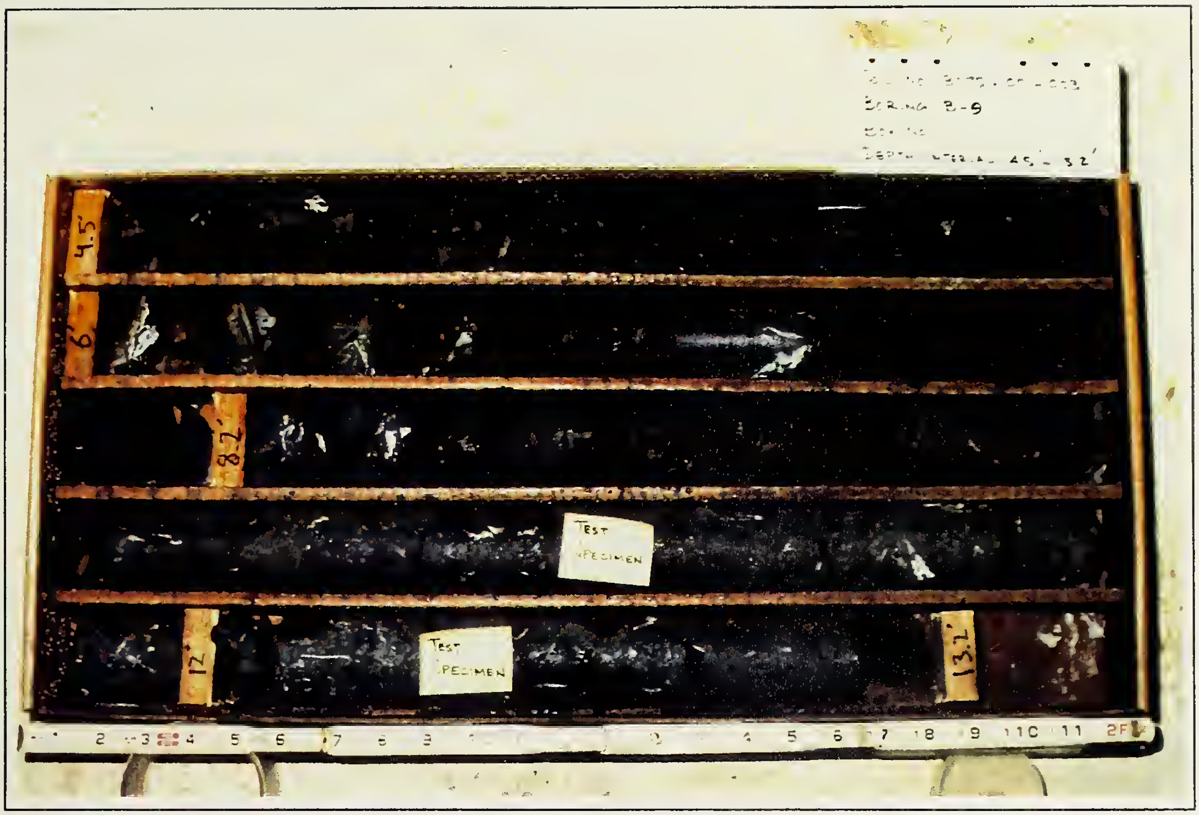
Job No: 30751-001-003
Pt. ID: CALTR / B-9

Dames & Moore, Inc.

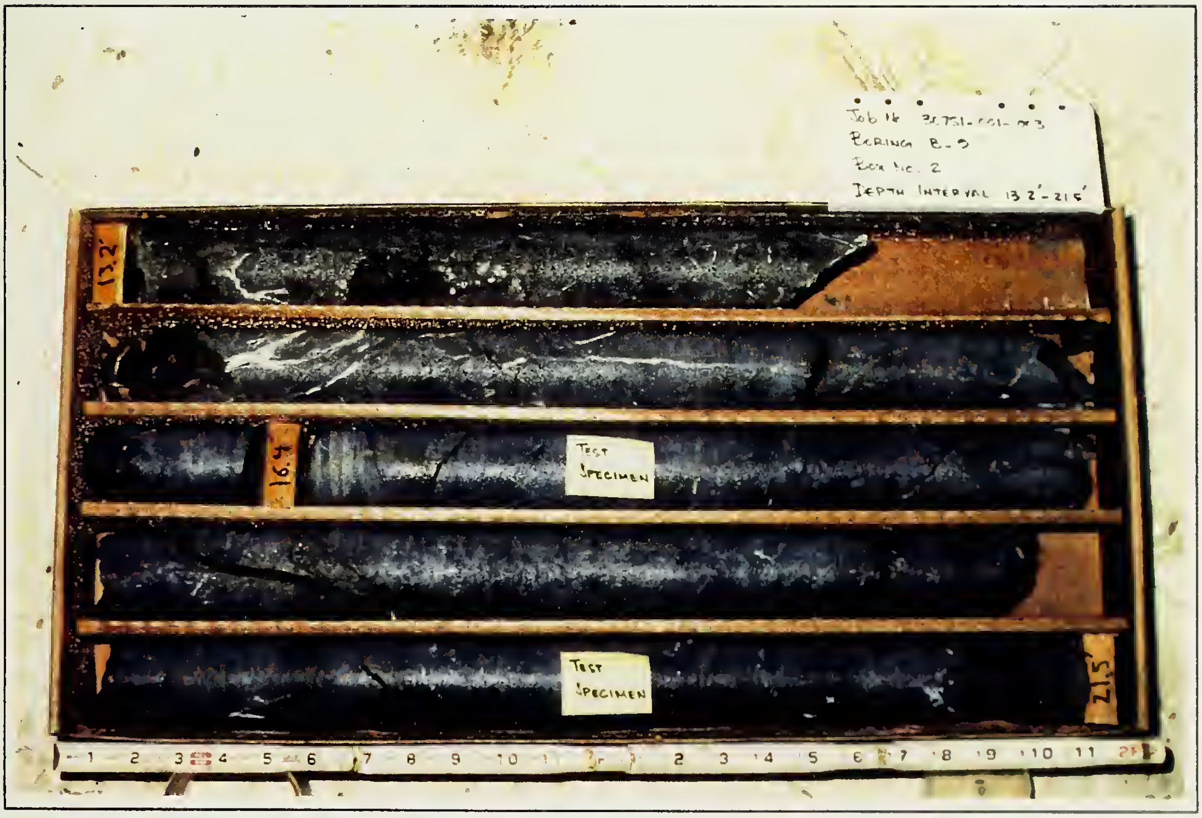
Log of Boring

Log Template: 15B

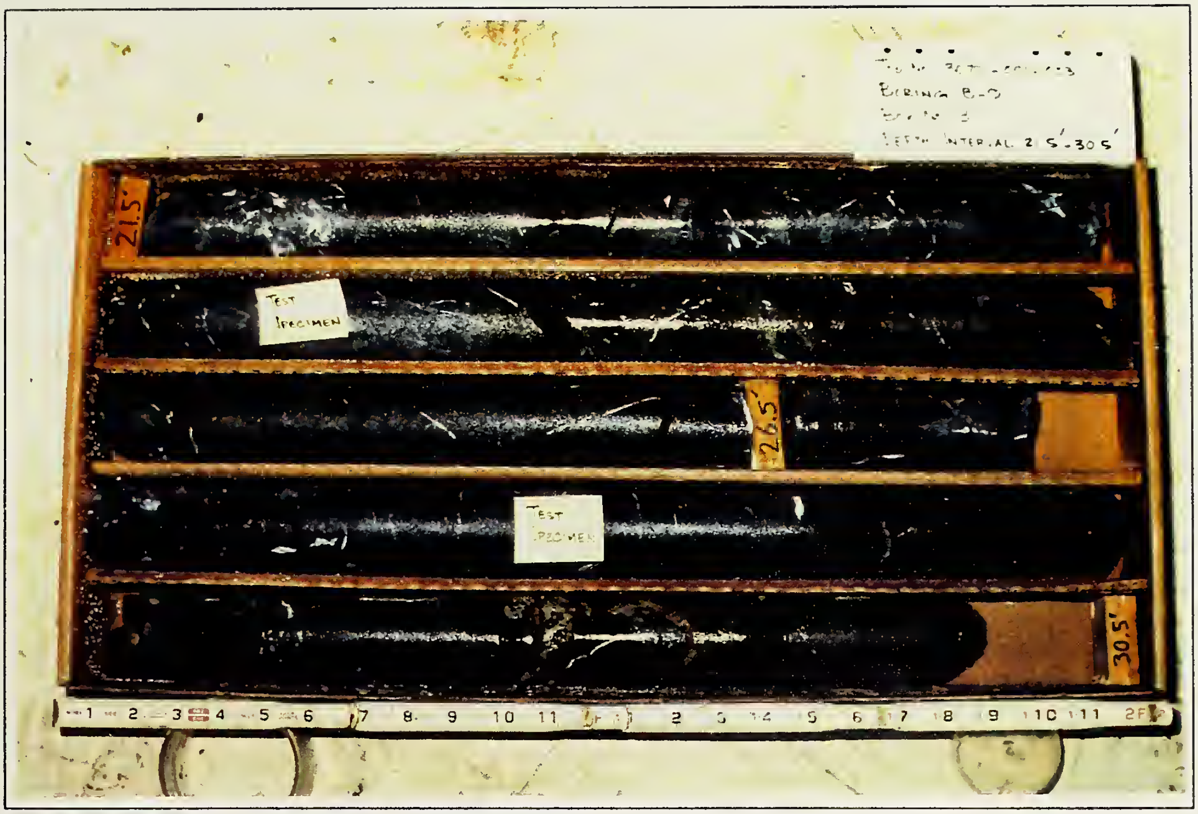
September 9, 1995



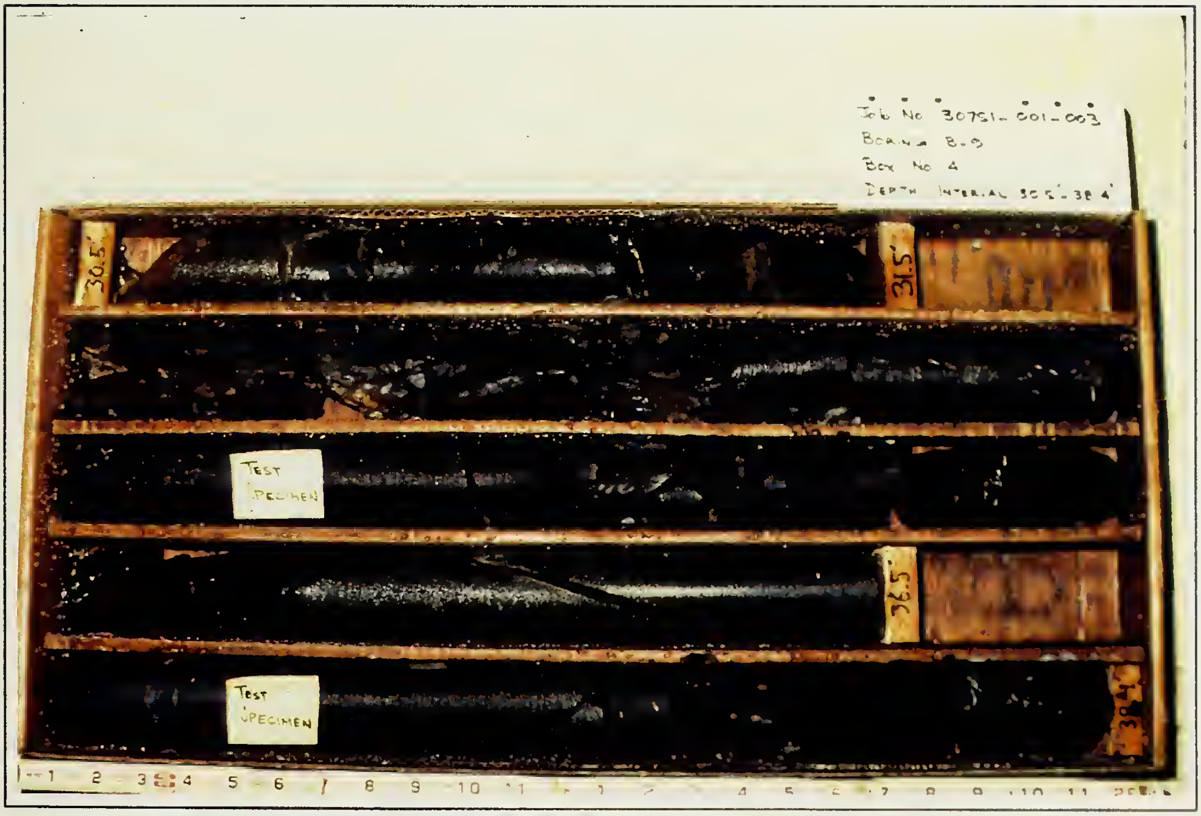
Boring No. B-9: Box No. 1, Depth Interval 4.5' - 13.2'



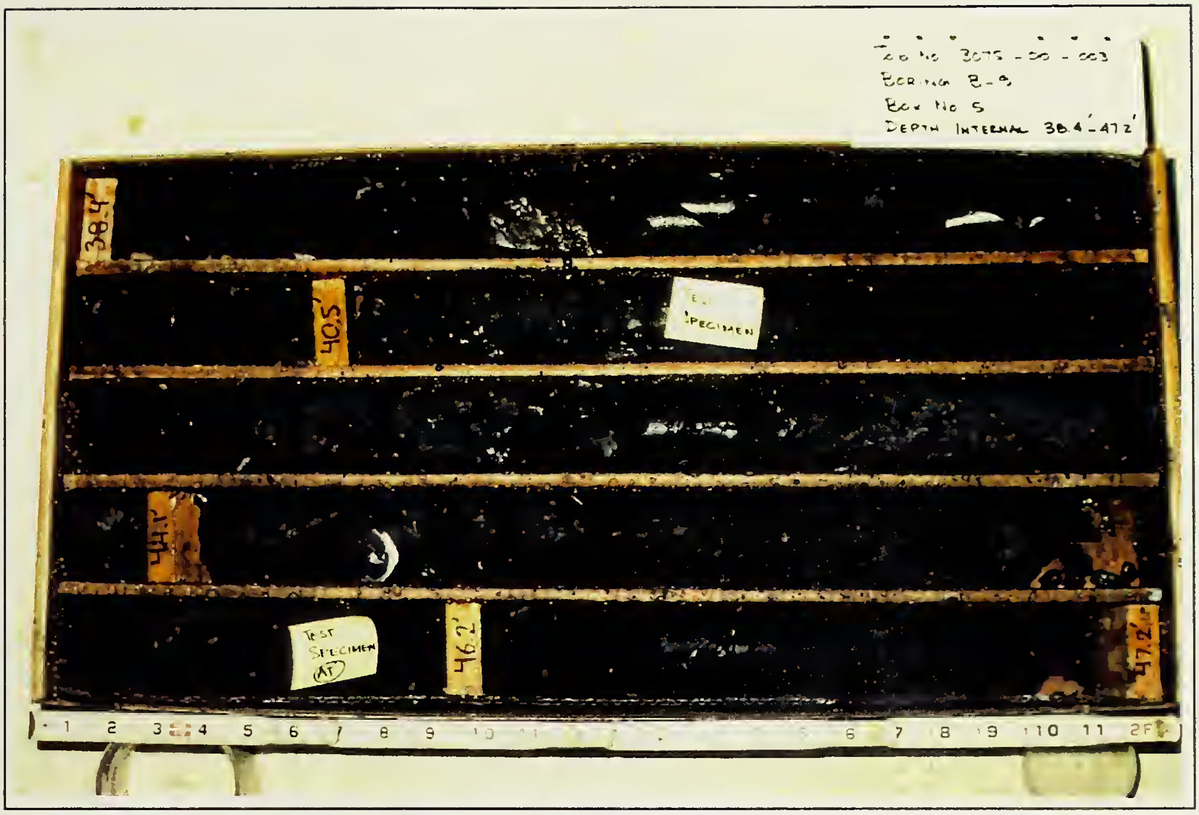
Boring No. B-9: Box No. 2, Depth Interval 13.2' - 21.5'



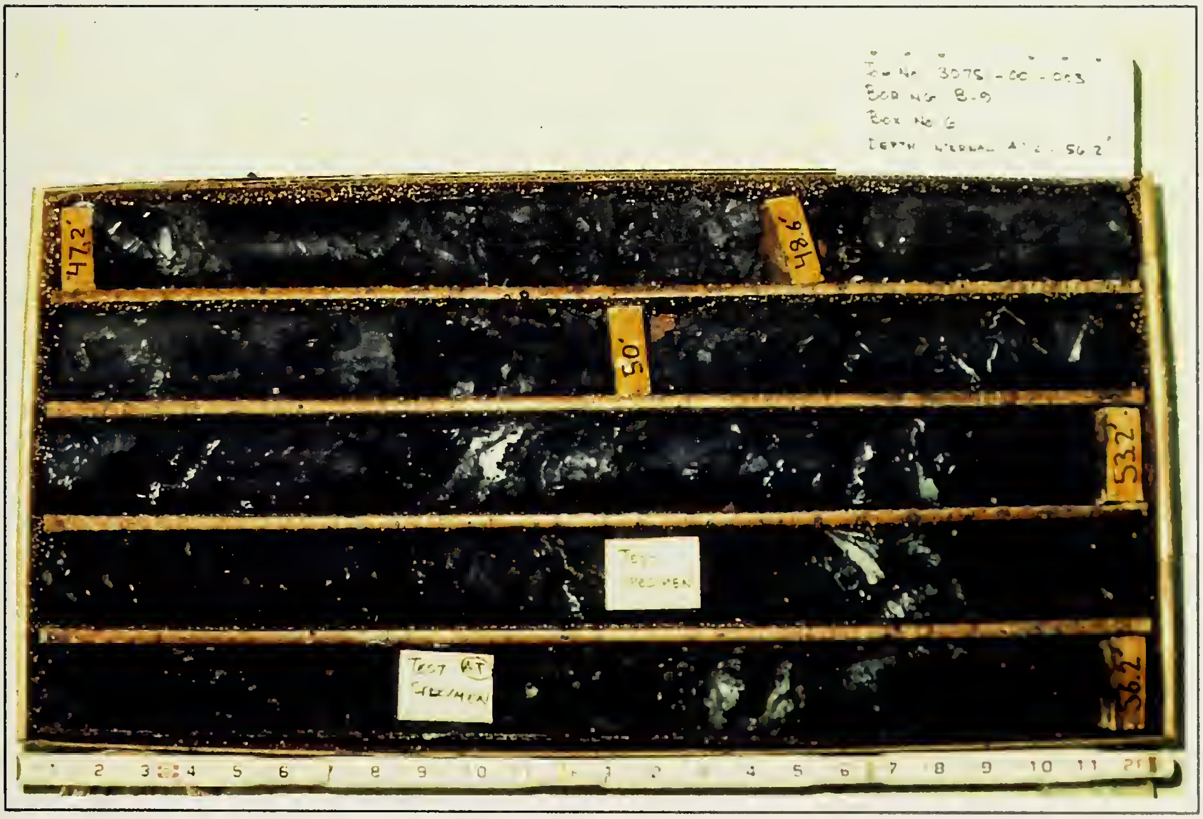
Boring No. B-9: Box No. 3, Depth Interval 21.5' - 30.5'



Boring No. B-9: Box No. 4, Depth Interval 30.5' - 38.4'

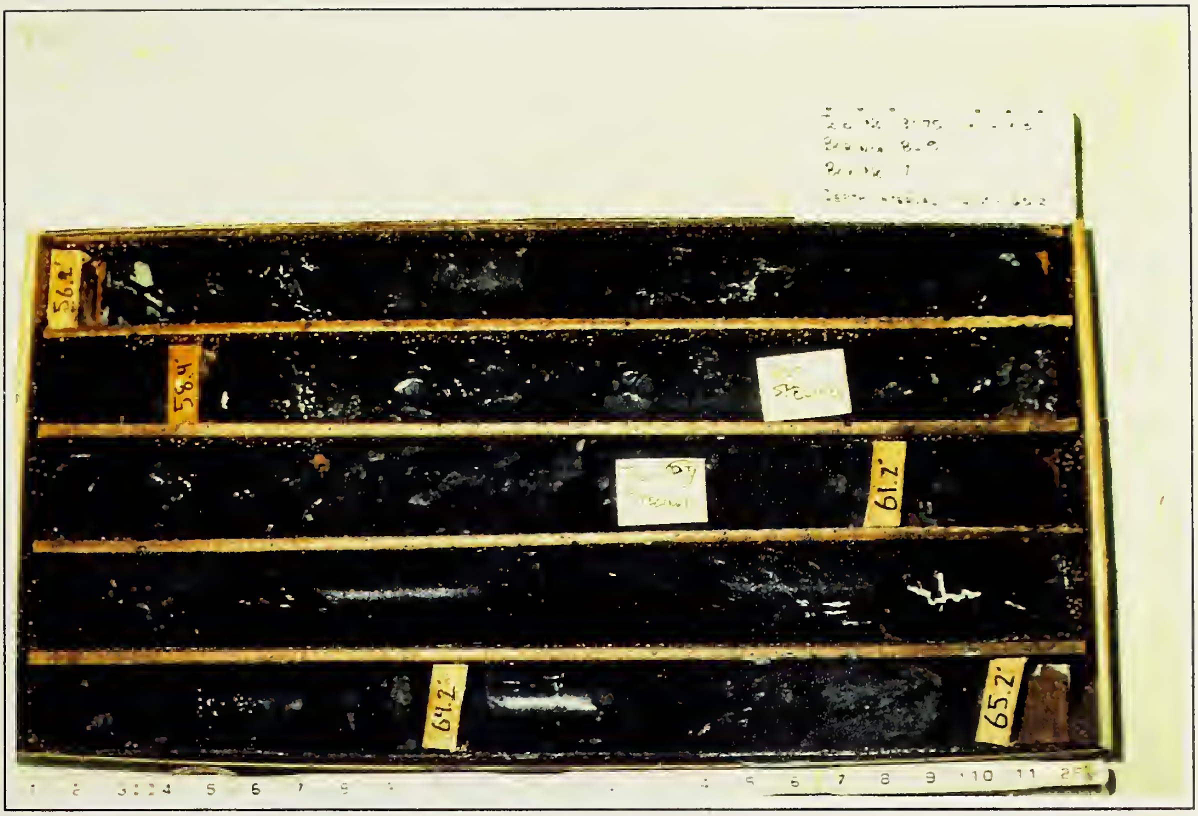


Boring No. B-9: Box No. 5, Depth Interval 38.4" - 47.2'

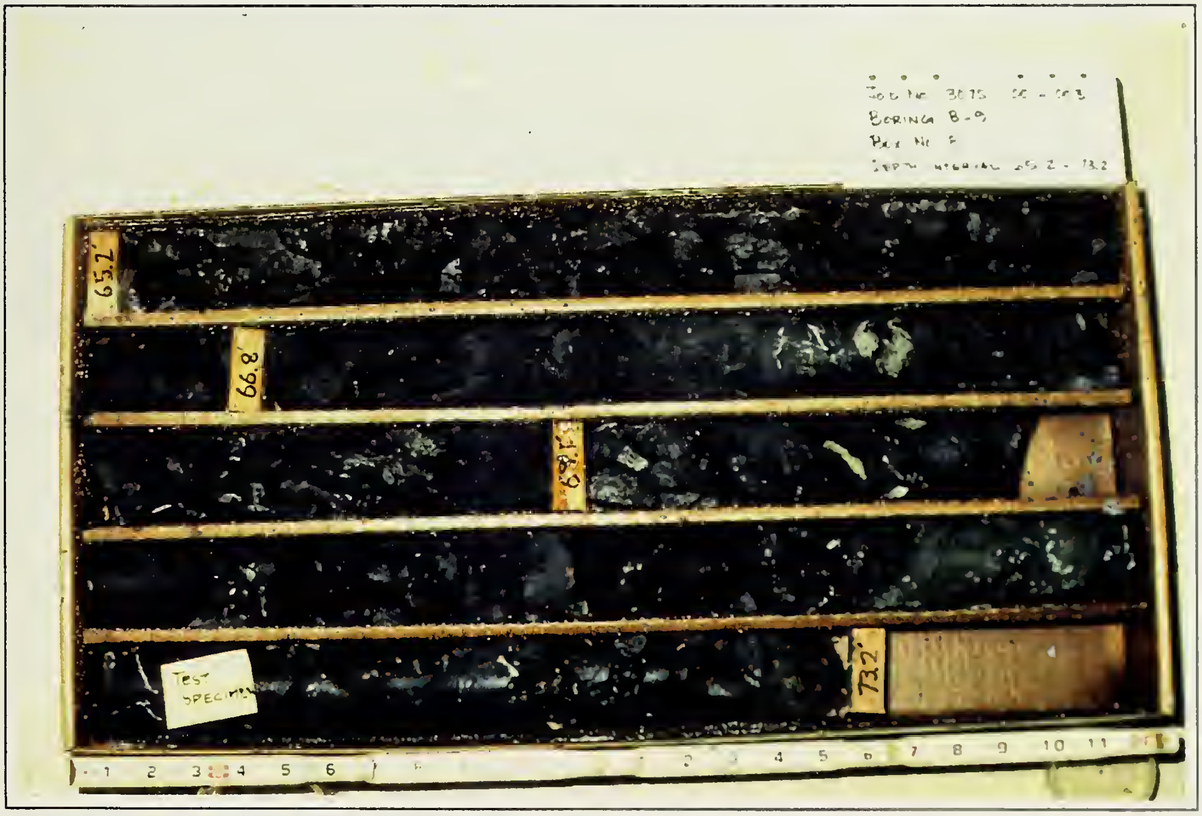


Boring No. B-9: Box No. 6, Depth Interval 47.2' - 56.2'

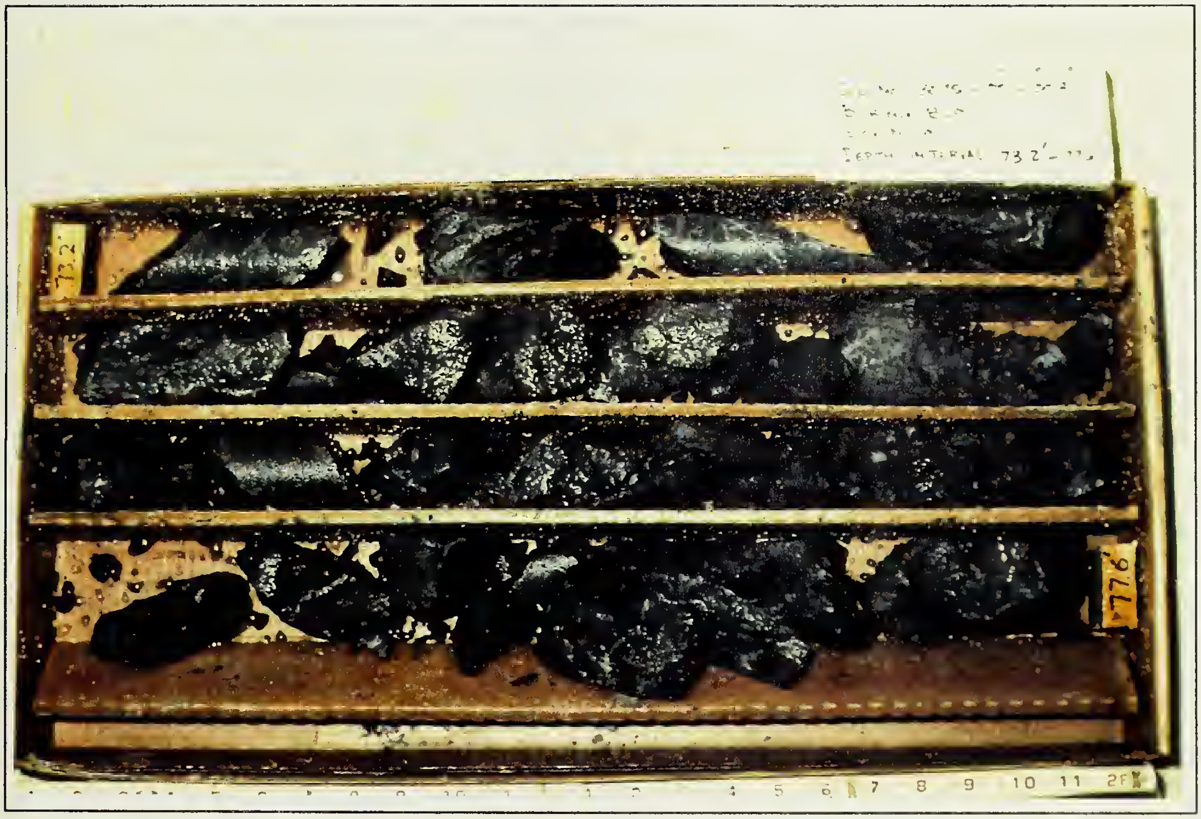
DAMES & MOORE
PLATE A-9 (cont.)



Boring No. B-9: Box No. 7, Depth Interval 56.2' - 65.2'



Boring No. B-9: Box No. 8, Depth Interval 65.2' - 73.2'



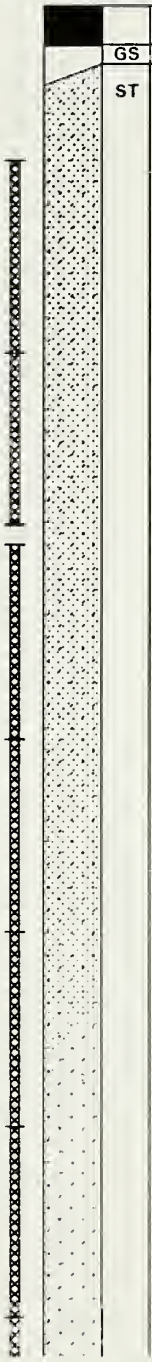
Boring No. B-9: Box No. 9, Depth Interval 73.2' - 77.6'

BORING B-10

DEPTH IN FEET	ROCK CHARACTERIZATION							
	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)
0								
5	NQ	1	100	9	10	WM	W-MS	14.2
					>60	WM		
10	NQ	2	90	20	10	WM	W-MS	12.6
					>60			
15	NQ	3	100	48	10	WM	W-MS	12.6
					1	WS	VS	
20	NQ	4	100	80	1	WS	VS	10.0
25	NQ	5	100	80	3	WS	VS	11.4
30	NQ	6	100	50	5	F	VS	9.0
35	NQ	7	100	10	10	F	VS	7.4

SAMPLES

SYMBOL



DESCRIPTION

REMARKS

0 - 1 feet Asphalt, Concrete, and Aggregate Base

GRAVELLY SAND [SUB-BASE]

YELLOWISH BROWN SANDSTONE, medium-to fine-grained, closely fractured to crushed, weak to moderately strong, moderately weathered, fracture surfaces are nearly planar and rough, common quartz fracture filling

Crushed zone with clay 7' to 8'

Crushed zone with clay 11.5' to 13.8'

Crushed zone with clay 14.8' to 15.6'

Crushed zone with little clay 16.5' to 17' and 17.6' to 17.8'

Grades to olive-gray, slightly weathered, strong, few fractures

Grades to very strong

Grades to gray, fresh

Locally interbedded with shale dipping 35 degrees

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-10

Dames & Moore, Inc.

Log of Boring

Date Completed: 7/28/95
Boring Depth: 72.0 ft.

Surface Elev: 35.0 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

Location:
San Francisco, Calif.

Log Template: 15B

September 12, 1995

BORING B-10

DEPTH IN FEET	ROCK CHARACTERIZATION								SAMPLES	SYMBOL	DESCRIPTION	REMARKS
	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)				
35											Fracture spacing decreases at 35 feet	
	NQ	8	100	20	5	F	VS	9.0				
40												
	NQ	9	100	0	20	F	VS	10.9				
45												
	NQ	10	100	0	10	F	VS	8.8				
50												
	NQ	11	100	55	5	F	VS	12.0				
55												
	NQ	12	100	80	1	F	VS	12.0				
60												
	NQ	13	100	15	5	F	VS	10.0		ST	GRAY SANDSTONE interbedded with dark gray sheared shale, highly fractured to crushed, weak to very weak, fresh	
65												
	NQ	14	100	60	3	F	VS	9.4				
70											Sheared shale at 69.5' to 70.5'	

Continued Next Page

BORING B-10

	ROCK CHARACTERIZATION											
DEPTH IN FEET	CORE TYPE	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	WEATHERING	STRENGTH	CORING RATE (IN/MIN)	SAMPLES	SYMBOL	DESCRIPTION	REMARKS
70									▨	▨		
75												
80												
85												
90												
95												
100												
105												

Notes:
1. Boring completed at a depth of 72 feet on 7/28/95.
2. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
3. Groundwater level indicates the depth at which water was encountered at the time of drilling.
4. See Plate A-17 for general log notes and explanation of the terms and symbols.

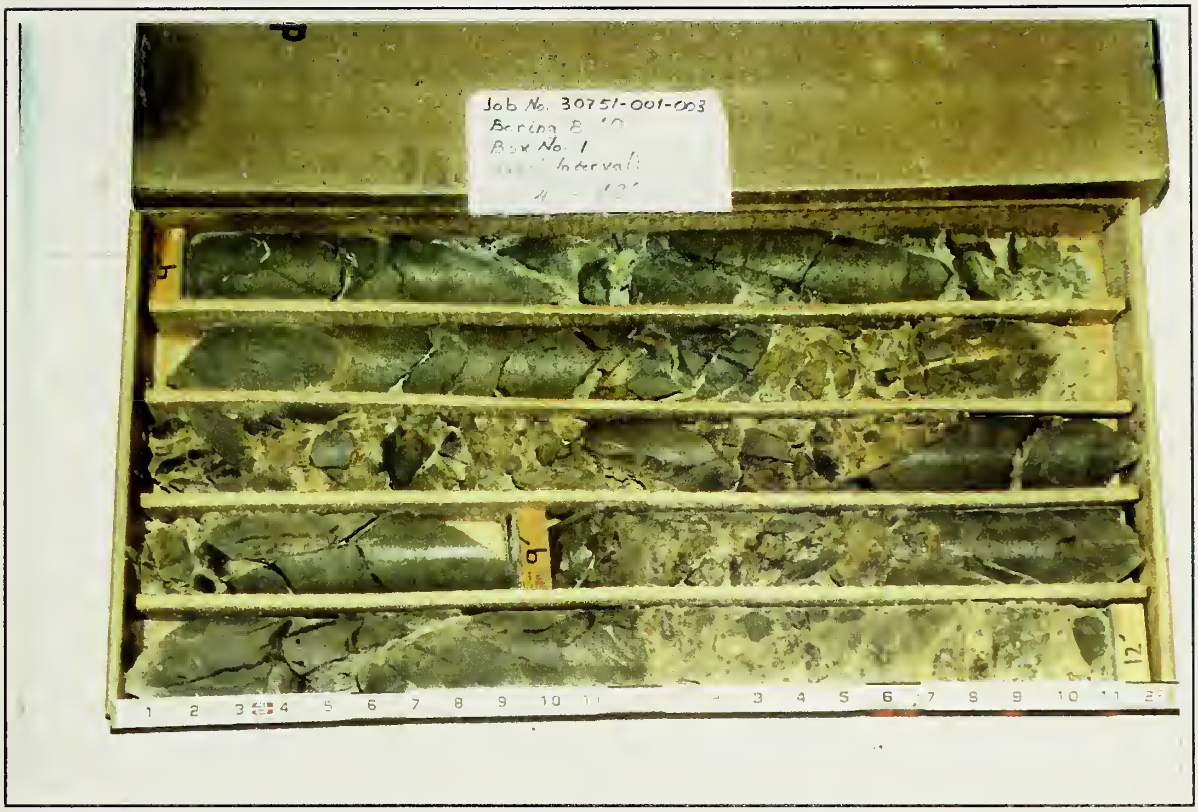
Job No: 30751-001-003
Pt. ID: CALTR / B-10

Dames & Moore, Inc.

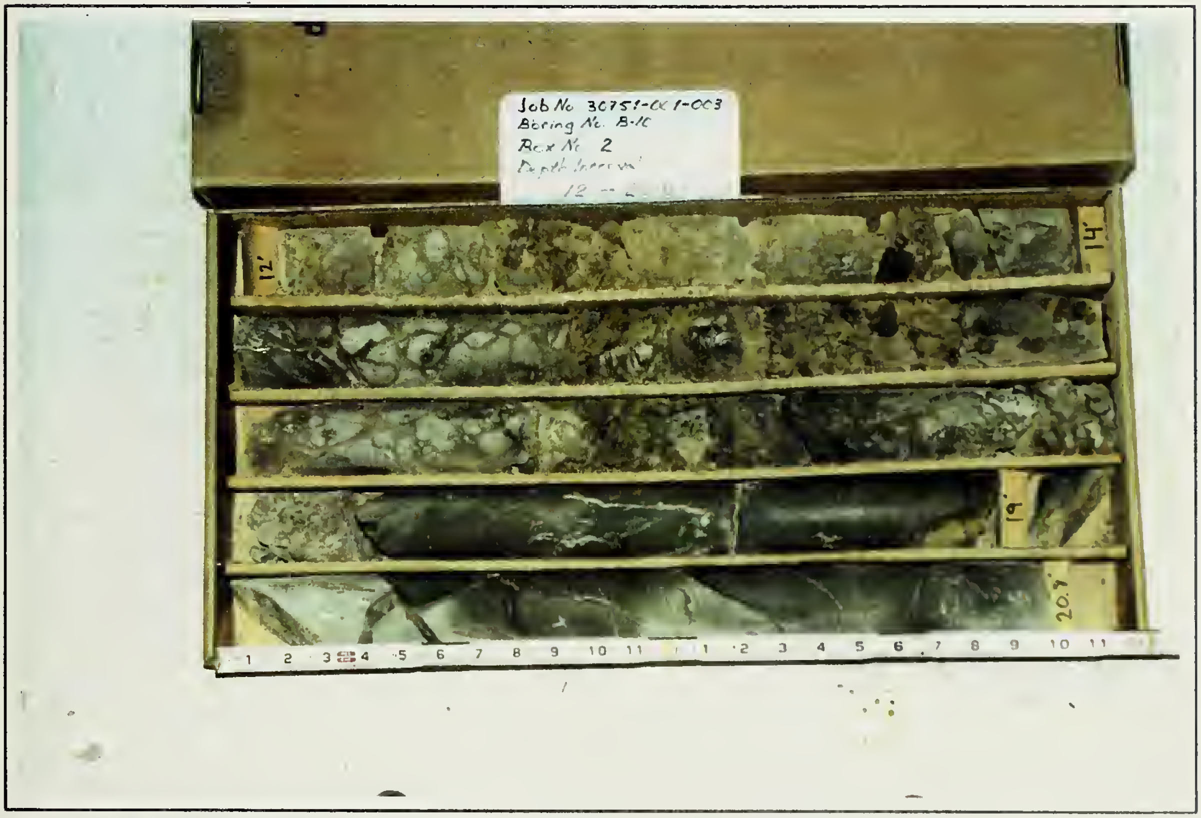
Log of Boring

Log Template: 15B

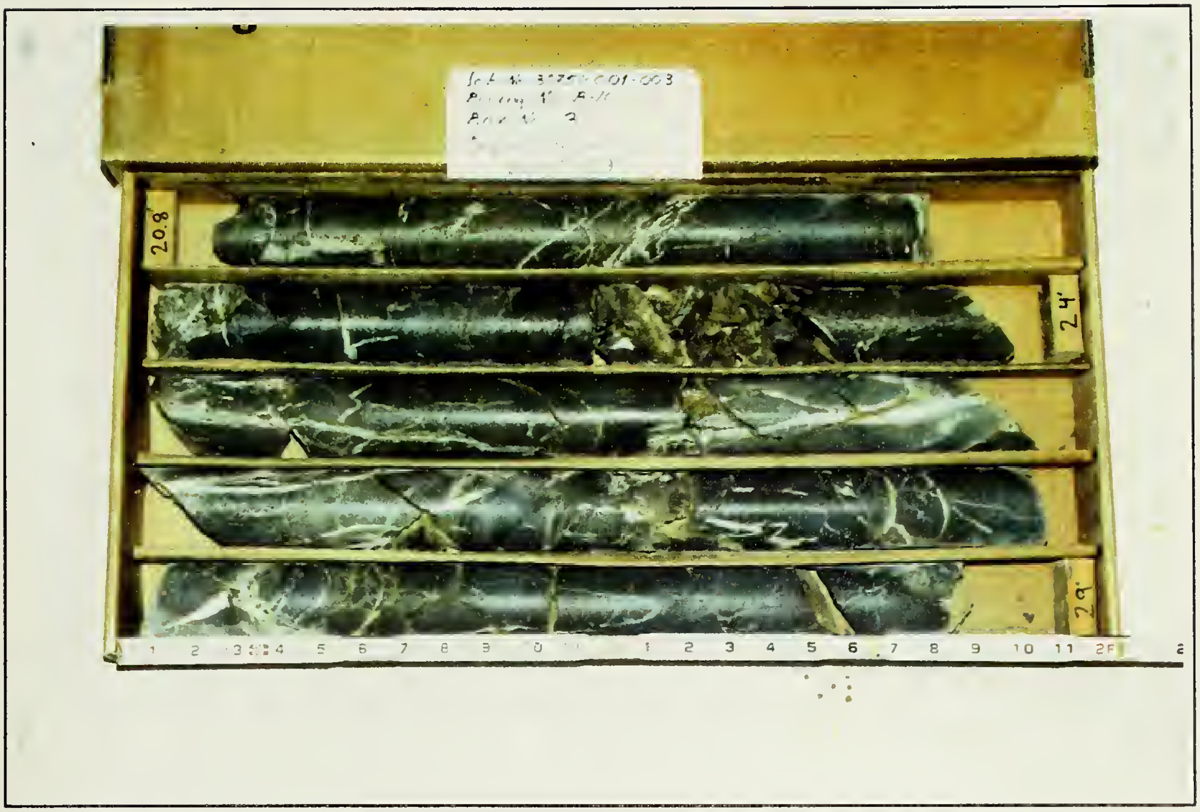
September 9, 1995



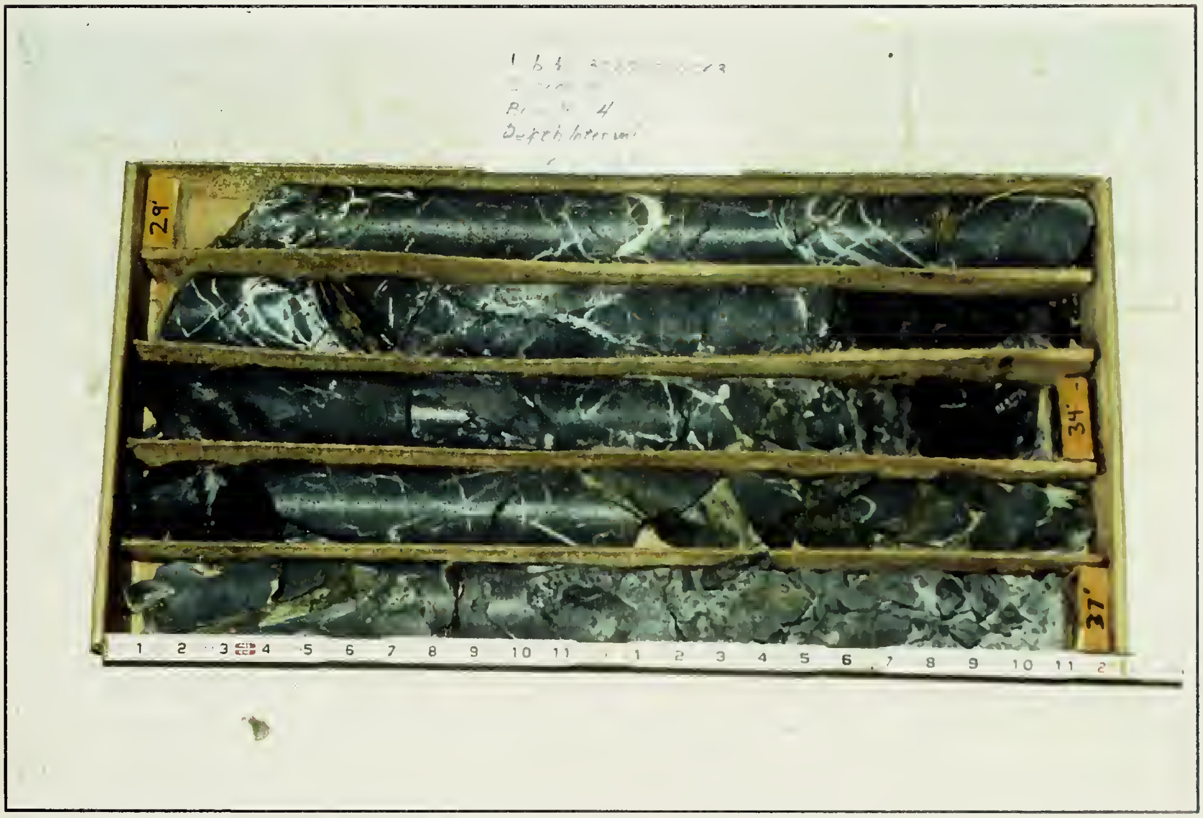
Boring No. B-10: Box No. 1, Depth Interval 4' - 12'



Boring No. B-10: Box No. 2, Depth Interval 12' - 20.8'

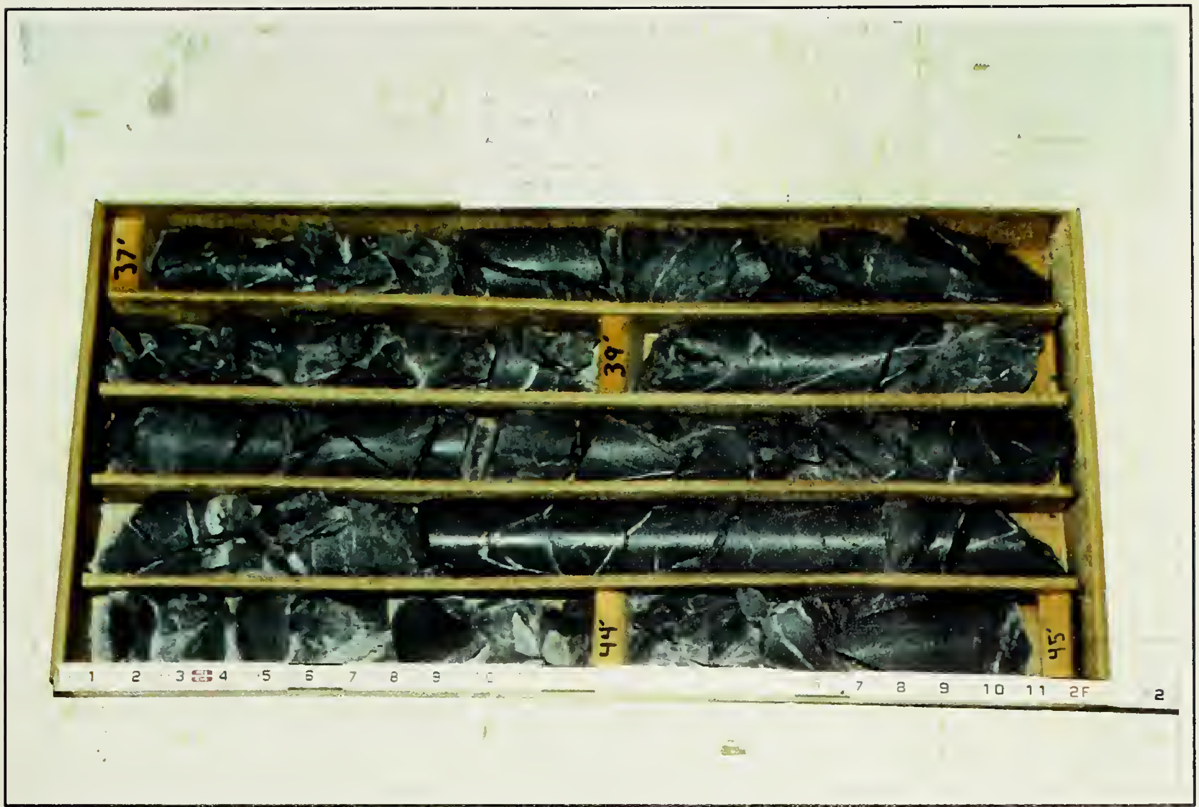


Boring No. B-10: Box No. 3, Depth Interval 20.8' - 29'

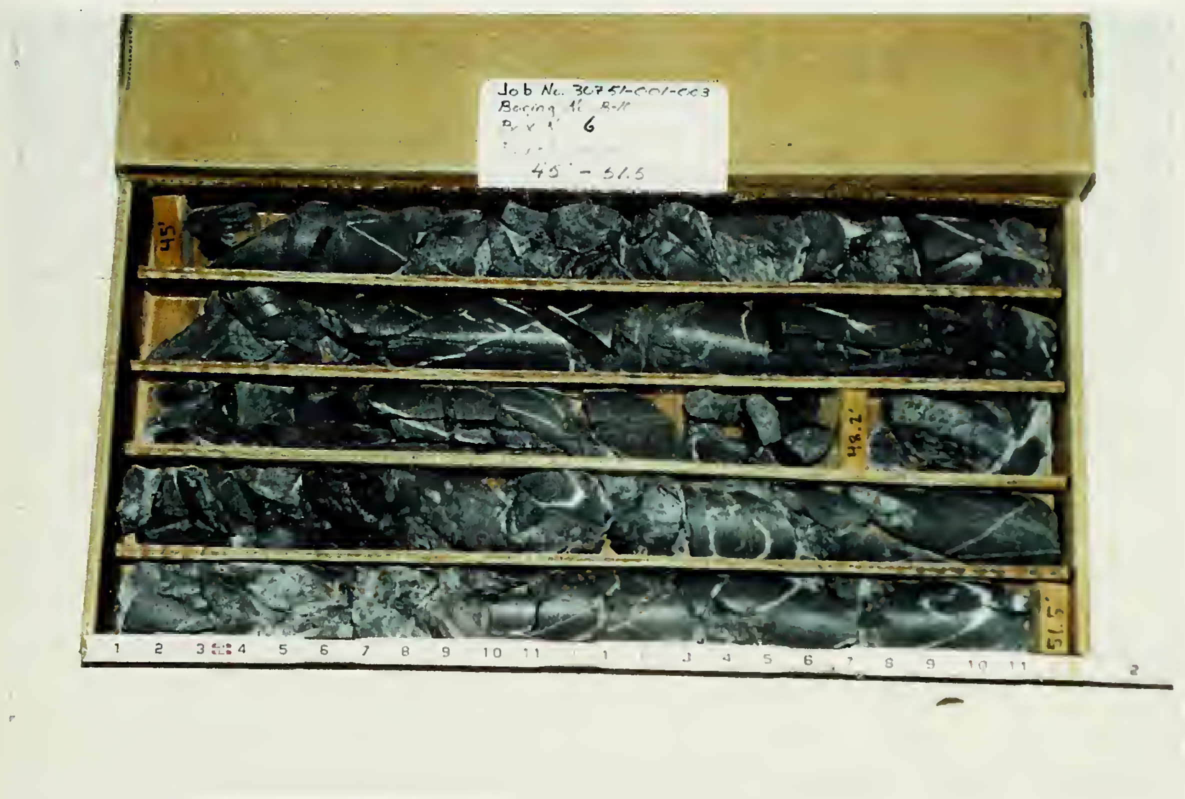


Boring No. B-10: Box No. 4, Depth Interval 29' - 37'

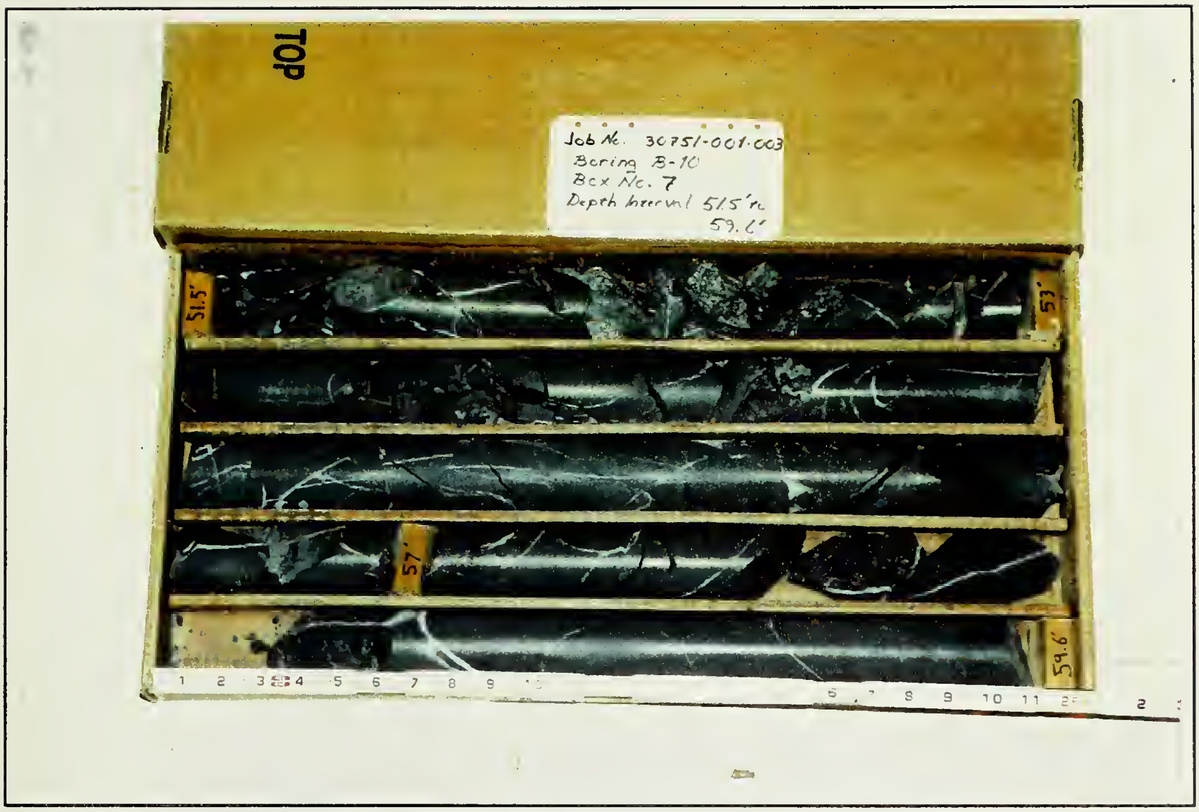
DAMES & MOORE
PLATE A-10 (cont.)



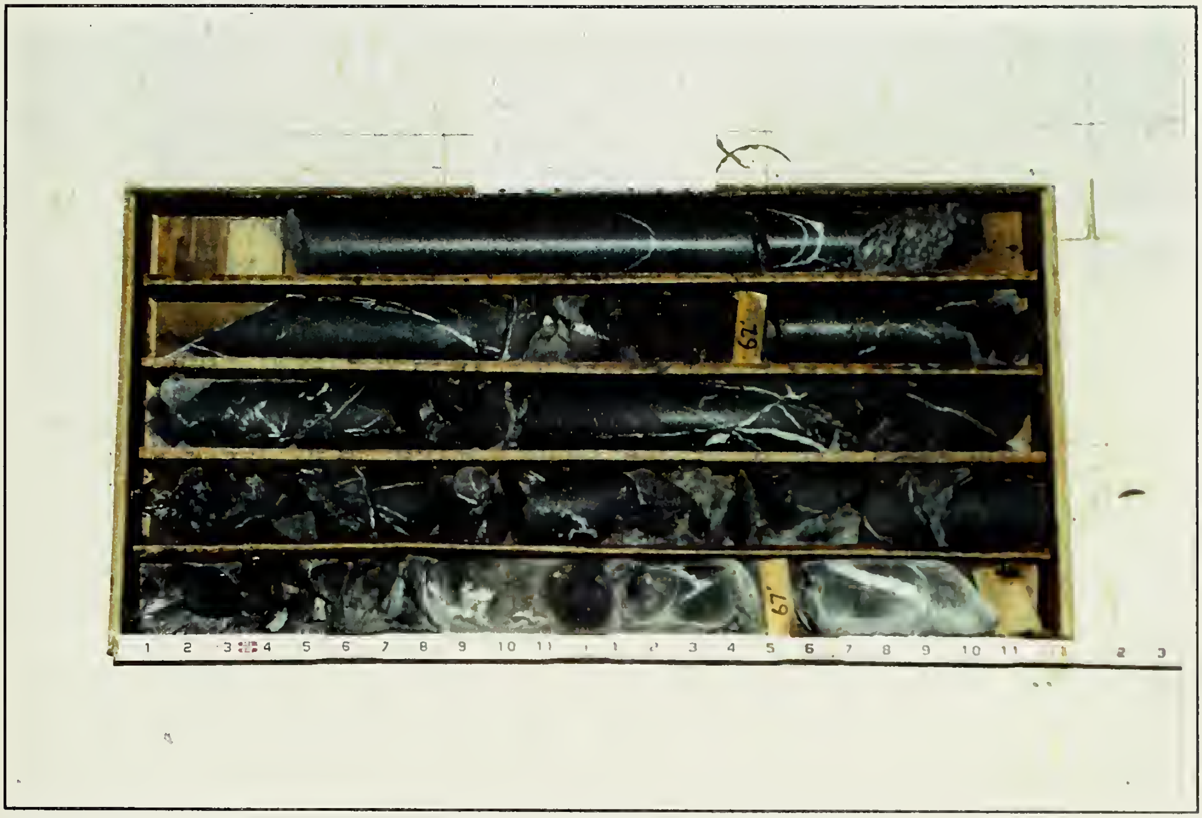
Boring No. B-10: Box No. 5, Depth Interval 37' - 45'



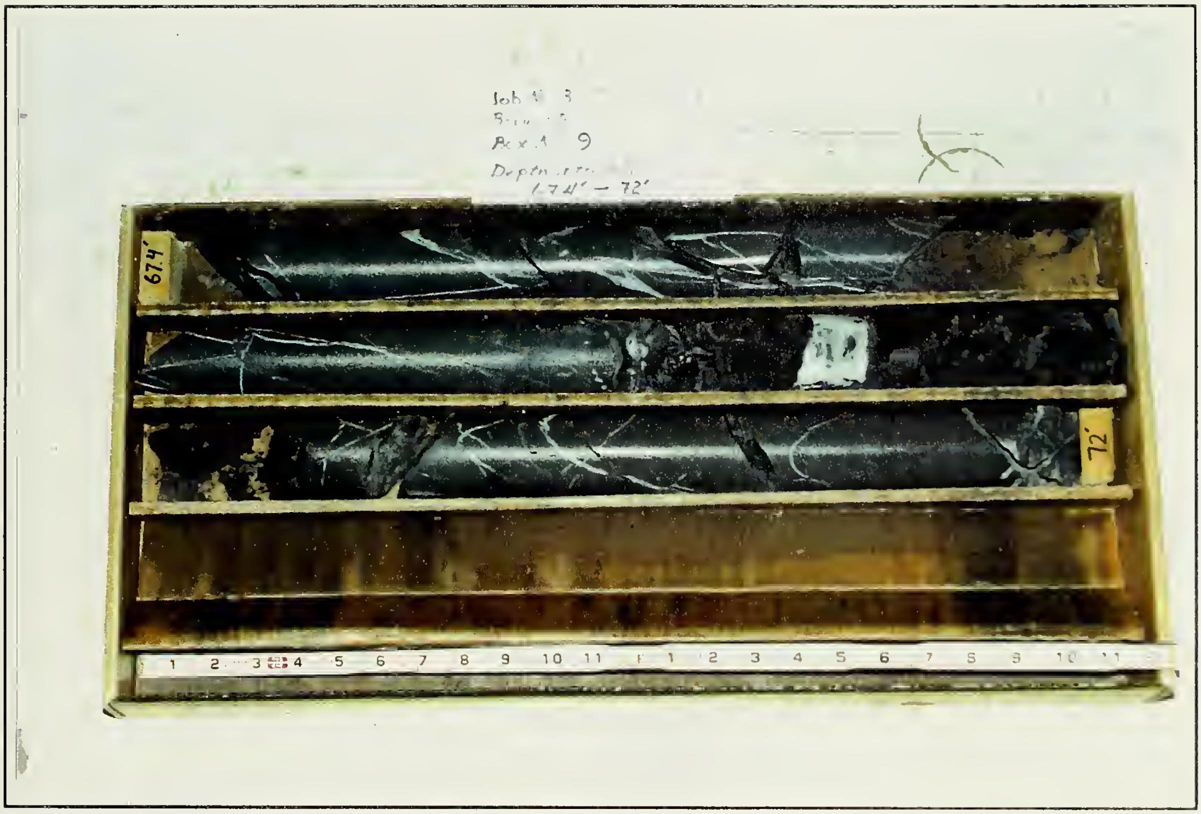
Boring No. B-10: Box No. 6, Depth Interval 45' - 51.5'



Boring No. B-10: Box No. 7, Depth Interval 51.5' - 59.6'

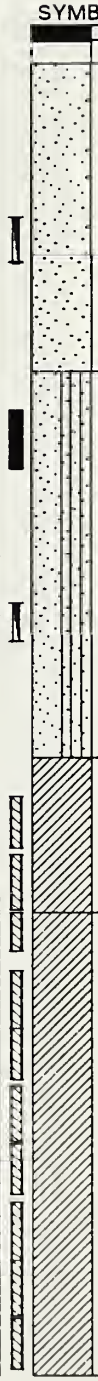


Boring No. B-10: Box No. 8, Depth Interval 59.6' - 67.4'



Boring No. B-10: Box No. 9, Depth Interval 67.4' - 72'

BORING B-11



DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE	SYMBOL	DESCRIPTION
0												ASPHALT CONCRETE 4 INCHES THICK
											SP	Brick, concrete, rubble
												BROWN SAND with trace of gravel, brick and concrete fragments, moist, loose
5									SPT	5		
											SP SM	OLIVE GRAY SAND trace of silt to silty, occasional clay lumps randomly intermixed, trace of gravel, wet, dense [NATIVE SAND]
10									U	34		
												Grades darker olive-gray
15									SPT	34		
											CL	GRAY SILTY SANDY CLAY trace of shell fragments, sand lenses, wet [BAY MUD]
20							23.2	128.5	P	120psi		
									P	90psi		
									P	140psi	CL	GRAY SANDY CLAY occasional clay lenses, some shell fragments, wet, medium stiff
25									P	140psi		
				TXUU	1950	757	48.0	108.1	P	150psi		
									P	140psi		
									P	130psi		
30									P	170psi		
									P	100psi		
												Grades with some fine gravel
									P	180psi		
35												

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-11

Dames & Moore, Inc.

Log of Boring

Date Completed: 8/8/95
Boring Depth: 96.0 ft.

Surface Elev: 3.0 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

Location:
San Francisco, Calif.

Log Template: SF1B

September 9, 1995

BORING B-11

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)							
35									SPT	50		SP SM	OLIVE GRAY SAND trace of silt to silty, occasional gravel, some shell fragments, wet, very dense
									U	50/3"			
40													
	13.1								SPT	50/6"			
									SPT	50/5"			Grades without gravel
45													
									SPT	55			
50									U	50/4"			
55													
	10.9			DS	2500 4000 5000	2542 3240 4423	18.9	130.4	U	50/4"			Grades with trace of gravel
60													Grades with clay lens
									U	96			Grades with occasional clay lenses
65													
												CH	GRAY SILTY CLAY trace of sand, wet, soft (OLD
70													

Continued Next Page

BORING B-11

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL		DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE				
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)								
70												▨		BAY CLAY] Laboratory vane shear strength = 707 psf
							65.0	98.2	U	8	■	▨		
75												▨		
80												▨		
												▨		DARK GRAY SILTY CLAY occasional peat pockets and sand lenses, very moist, soft
									U	12	■	▨		
85												▨		
90												▨		
												▨		Grades more sandy
												▨		Grades with fine sand lenses
												▨	CL	OLIVE GREEN SANDY CLAY wet, stiff
95							25.8	125.4	U	32	■	▨		
100														
105														

Notes:

1. Boring completed at a depth of 96 feet on 8/8/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches, sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / B-11

Dames & Moore, Inc.

Log of Boring

BORING B-11

	LABORATORY TEST DATA								SAMPLING				
		ATTERBERG LIMITS		STRENGTH DATA									
DEPTH IN FEET	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	SAMPLES	SYMBOL	DESCRIPTION
105													4. Groundwater level indicates the depth at which water was encountered at the time of drilling. 5. See Plate A-17 for general log notes and explanation of the terms and symbols.
110													
115													
120													
125													
130													
135													
140													

Continued Next Page

BORING FV-2

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
		ATTERBERG LIMITS		STRENGTH DATA									
	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
0												■	8-inch Concrete
												SM SC	BROWN SILTY AND CLAYEY FINE SAND, occasional gray lenses (moist) (dense) [FILL]
												SP	BROWN FINE SAND with trace silt and dark brown pockets (medium dense) [FILL]
5													
									U	14	■		
													▽
10													
									U	34	■		Grades to gray with bricks and rocks
15													
													Grades to muddy
												SC CL	GRAY CLAYEY FINE SAND with trace of shell (wet) (loose)
									U	8	—		
20									U	7	■		
												CH	GRAY PLASTIC CLAY with trace of shells, medium stiff to stiff [BAY MUD]
									FV		▯		
25													
									FV		▯		
30													
									FV		▯		
												SM	GRAY SILTY SAND (wet) (dense) [UPPER SANDS WITH CLAY LENSES]
35													

Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / FV-2

Dames & Moore, Inc.

Log of Boring

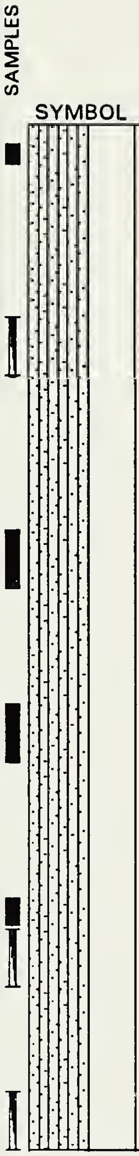
Date Completed: 6/13/95
Boring Depth: 61.5 ft.

Surface Elev: 3.0 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

Location:
San Francisco, Calif.

BORING FV-2

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	
35									U	72	
40									SPT	65	Grades with less silt and occasional clayey lenses and trace shell fragments (very dense)
45									U	54	
											Grades to yellowish brown and clayey
50									U	70	Grades with occasional red lenses, trace of cementation & clay lenses
											Grades to yellowish brown and trace of gravel
55									U	50/4"	
									SPT	70	Occasional thin lenses of clay
60									SPT	86/ 11.5"	Grades silty
65											
70											



Notes:
1. Boring completed at a depth of 61.5 feet on 6/13/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches; sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the

Continued Next Page

BORING FV-2

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)							
70													boring was drilled. 4. Groundwater level indicates the depth at which water was encountered at the time of drilling. 5. See Plate A-17 for general log notes and explanation of the terms and symbols.
75													
80													
85													
90													
95													
100													
105													

Job No: 30751-001-003
Pt. ID: CALTR / FV-2

Dames & Moore, Inc.

Log of Boring

Log Template: SF1C

September 9, 1995

BORING FV-3

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL		DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE				
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)								
0												■		4-inch Asphalt and 6-inch Concrete
													SP	BROWN SAND with brick fragments and concrete debris [FILL]
														Old debris concrete
5														
														Grade to more brick fragments and trace with shell fragments
														Grades to trace with brick fragments
10									U	20	■			Grades moist and medium dense
														grades wet
15														▽
														Grades to gray and brown
20														Gray and brownish gray fine sand to silty fine sand, occasional brick and concrete fragments, trace of gravel, wet
25														
												▨	CL	CLAYEY SAND
												▨	CH	GRAY SILTY CLAY, some shell fragments [BAY MUD]
30														
									FV		▯			Field Vane (FV) test started
35														

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / FV-3	**Dames & Moore, Inc.**	**Log of Boring**
Date Completed: 6/9/95 Boring Depth: 60.0 ft.	Surface Elev: 1.0 ft. (C.C.S.F. Datum) Coordinates: Not surveyed	Location: San Francisco, Calif.

Log Template: SF1C

September 9, 1995

BORING FV-3

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
		ATTERBERG LIMITS		STRENGTH DATA									
	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
35									FV		▯	▨	
									FV		▯	▨	
40												▨	
									FV		▯	▨	
45									FV		▯	▨	
50									FV		▯	▨	
55									FV		▯	▨	
									FV		▯	▨	
60													
65													
70													

Notes:
1. Boring completed at a depth of 60 feet on 6/12/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches; sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / FV-3	**Dames & Moore, Inc.**	**Log of Boring**

Log Template: SF1C

September 9, 1995

BORING FV-3

	LABORATORY TEST DATA								SAMPLING				
		ATTERBERG LIMITS		STRENGTH DATA									
DEPTH IN FEET	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	SAMPLES	SYMBOL	DESCRIPTION
70													5. See Plate A-17 for general log notes and explanation of the terms and symbols.
75													
80													
85													
90													
95													
100													
105													

Job No: 30751-001-003
Pt. ID: CALTR / FV-3

Dames & Moore, Inc.

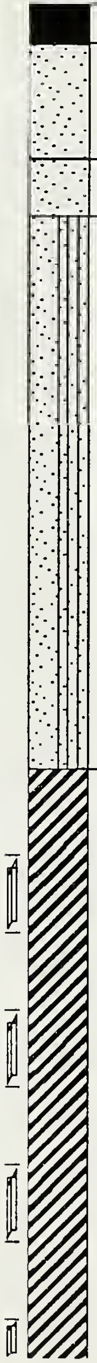
Log of Boring

Log Template: SF1C

September 9, 1995

BORING FV-4

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL		DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE				
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)								
0														2" Asphalt, 12" Concrete
													SP	Brown sand with bricks and concrete debris [FILL]
													SP	YELLOW BROWN SAND with cobbles [FILL]
5													SP SM	YELLOWISH BROWN SILTY FINE SAND [FILL] Changes to dark brown, trace of odor Brown sand, occasional silty, rock fragments and trace of organics
10														
15														
20													CH	GRAY SILTY CLAY, medium stiff [BAY MUD]
									FV					
25									FV					
30									FV					
									FV					
35														



Continued Next Page

Job No: 30751-001-003
Pt. ID: CALTR / FV-4

Dames & Moore, Inc.

Log of Boring

Date Completed: 7/31/95
Boring Depth: 92.2 ft.

Surface Elev: 0.5 ft. (C.C.S.F. Datum)
Coordinates: Not surveyed

Location:
San Francisco, Calif.

Log Template: SF1C

September 9, 1995

BORING FV-4

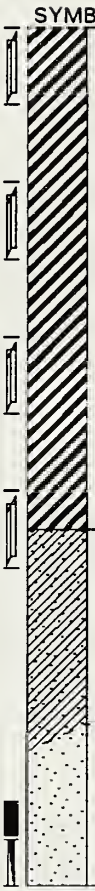
	LABORATORY TEST DATA								SAMPLING				
		ATTERBERG LIMITS		STRENGTH DATA									
DEPTH IN FEET	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	SAMPLES	SYMBOL	DESCRIPTION
35											▯	▨	
									FV		▯		
40													
									FV		▯		
45													
									FV		▯		
50									FV		▯		
									FV		▯		
55													
									FV		▯		
60													
													Thin layer of sand
									FV		▯		
65													
									FV		▯		
70													

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / FV-4	Dames & Moore, Inc.	Log of Boring

BORING FV-4

	LABORATORY TEST DATA								SAMPLING			
		ATTERBERG LIMITS		STRENGTH DATA								
DEPTH IN FEET	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	SYMBOL	DESCRIPTION
70									FV			
									FV			
75												
									FV			
80												
									FV			
											SC	GRAY CLAYEY SAND, trace of shell and gravel
85												
											SP	GREENISH GRAY SAND, very dense
90									U	76/10"		
									SPT	80/8"		
95												
100												
105												



Notes:
1. Boring completed at a depth of 92.2 feet on 7/31/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches; sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.

Job No: 30751-001-003 Pt. ID: CALTR / FV-4	Dames & Moore, Inc.	Log of Boring

Log Template: SF1C

September 9, 1995

BORING FV-5

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)							
0													4" Asphalt, 8" Concrete
												GM	~12" Sand and Gravel (Road base)
												GP	~12" Crushed rocks (Railroad ballasts)
												SP	DARK BROWN CLAYEY SAND AND SAND with bricks and rocks [FILL]
5													Some rubble
													Brown gray silty sand with some bricks and rocks and trace of clay [FILL]
													Grades with some wood
10													BROWN SAND, occasional gravels [FILL]
													Yellowish brown sand, trace of clay lumps and gravel [FILL]
15													
													Grades to brown and dark brown
20												CH	GRAY SILTY CLAY with some sand and rock fragments [BAY MUD]
												CH	GRAY SILTY CLAY, medium stiff [BAY MUD]
									FV		▯		
25													
									FV		▯		
30													
									FV		▯		
35													

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / FV-5	**Dames & Moore, Inc.**	**Log of Boring**
Date Completed: 8/4/95 Boring Depth: 89.5 ft.	Surface Elev: 1.0 ft. (C.C.S.F. Datum) Coordinates: Not surveyed	Location: San Francisco, Calif.

Log Template: SF1C

September 9, 1995

BORING FV-5

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		DESCRIPTION
		ATTERBERG LIMITS		STRENGTH DATA							
	(%) PASSING NO. 200 SIEVE	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	
35											
									FV		
											Grades to some shell fragments
40											
									FV		
											Grades sandier
45											
									FV		
											Grades to no shell fragments
50											
									FV		
									FV		
55											
									FV		
60											
									FV		
65											
									FV		Grades stiff to very stiff
70											

SAMPLES SYMBOL

Continued Next Page

BORING FV-5

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE	
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)					
70											
									U	7	■
75											
									U	12	■
80											
85									FV		
90											
95											
100											
105											

SYMBOL		DESCRIPTION
▨		
▨	SC	GRAY SANDY CLAY
	SM ML	GRAY SILTY CLAY AND SILTY SAND, interbedded, soft and loose, trace of shell fragments Grades to more silty
	SM	GRAY SILTY FINE SAND, trace to some clay lenses, loose
▨	CH	GRAY SILTY CLAY, trace of sand and peat, medium stiff [BAY MUD]

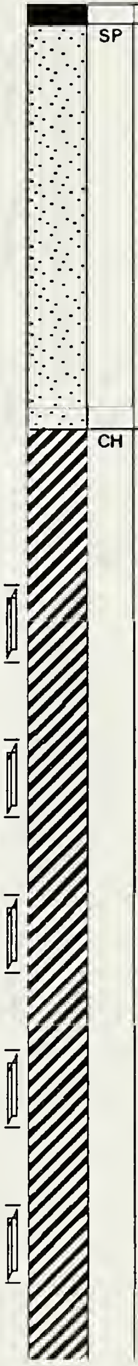
Notes:
1. Boring completed at a depth of 89.5 feet on 8/3/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches; sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. Groundwater level indicates the depth at which water was encountered at the time of drilling.
5. See Plate A-17 for general log notes and explanation of the terms and symbols.

Job No: 30751-001-003 Pt. ID: CALTR / FV-5	Dames & Moore, Inc.	Log of Boring

Log Template: SF1C

September 9, 1995

BORING FV-6



DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE	SAMPLES	SYMBOL	DESCRIPTION
0													6" Asphaltic concrete
												SP	BROWN GRAVELLY SAND, some clay [FILL]
													Brown and gray sand, some concrete fragments [FILL]
													Grades with some gravel, yellowish brown
5													
													Trace of brick fragments
10													
												CH	GRAY SILTY CLAY with sand and rubble [BAY CLAY AND FILL MIXTURE]
													Gray silty clay [BAY MUD]
15									FV				
									FV				
20													
									FV				
25													Shells and shell fragments
									FV				
30													No shell
									FV				
													Trace of organic
35													

Continued Next Page

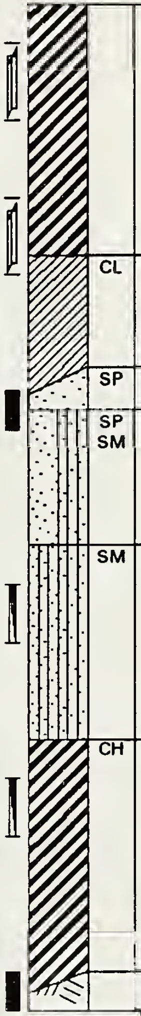
Job No: 30751-001-003 Pt. ID: CALTR / FV-6	**Dames & Moore, Inc.**	**Log of Boring**
Date Completed: 8/1/95 Boring Depth: 61.0 ft.	Surface Elev: 4.0 ft. (C.C.S.F. Datum) Coordinates: Not surveyed	Location: San Francisco, Calif.

Log Template: SF1C

September 9, 1995

BORING FV-6

DEPTH IN FEET	LABORATORY TEST DATA: (%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: NORMAL OR CONFINING PRESSURE(PSF)	STRENGTH DATA: SHEAR STRENGTH (PSF)	MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	SAMPLING: TYPE OF SAMPLER	SAMPLING: SAMPLING RESISTANCE	SYMBOL	DESCRIPTION
35												
									FV			Some sand lenses
40									FV			Grades to more sandy
											CL	GRAY SILTY CLAY with sand lenses
												Grayish green clayey sand, trace of gravel
											SP	GRAYISH GREEN SAND, very dense
45									U	69/6"	SP SM	BROWN SAND, trace to silty, very dense
												Grades to more silty
											SM	BROWN SILTY FINE SAND, occasional lightly cemented lenses, dense to very dense
50									SPT	67		
												Grades to clayey
											CH	LIGHT GRAYISH BROWN SILTY CLAY, very sticky, stiff
55									SPT	13		
												Grades to brown
60									U	96/6"		GREENISH GRAY WEATHERED SANDSTONE TO YELLOW AND GOLDEN BROWN CEMENTED SAND (COMPLETELY DECOMPOSED SANDSTONE)
65												
70												



Notes:

1. Boring completed at a depth of 61 feet on 8/1/95.
2. Sampling resistance for "SPT" and "U" samplers are measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after the sampler has been seated 6 inches; sampling resistance for "P" type sampler is measured in psi required to push the sampler 18 inches into the soil.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.

Continued Next Page

Job No: 30751-001-003 Pt. ID: CALTR / FV-6	**Dames & Moore, Inc.**	**Log of Boring**

Log Template: SF1C

September 9, 1995

BORING FV-6

DEPTH IN FEET	LABORATORY TEST DATA								SAMPLING		SAMPLES	SYMBOL	DESCRIPTION
	(%) PASSING NO. 200 SIEVE	ATTERBERG LIMITS		STRENGTH DATA			MOISTURE CONTENT (%)	TOTAL DENSITY (PCF)	TYPE OF SAMPLER	SAMPLING RESISTANCE			
		LIQUID LIMIT (%)	PLASTICITY INDEX (%)	TYPE OF TEST	NORMAL OR CONFINING PRESSURE(PSF)	SHEAR STRENGTH (PSF)							
70													4. Groundwater level indicates the depth at which water was encountered at the time of drilling. 5. See Plate A-17 for general log notes and explanation of the terms and symbols.
75													
80													
85													
90													
95													
100													
105													

Job No: 30751-001-003
Pt. ID: CALTR / FV-6

Dames & Moore, Inc.

Log of Boring

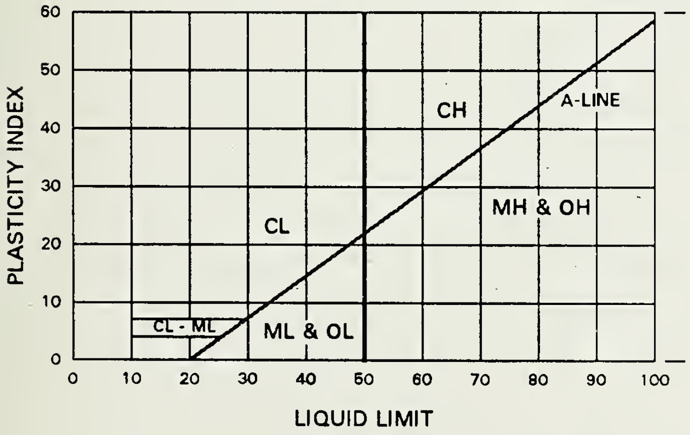
Log Template: SF1C

September 9, 1995

UNIFIED SOIL CLASSIFICATION SYSTEM

GRAPHIC	SYMBOL	DESCRIPTION	MAJOR DIVISIONS				
▨	GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	**CLEAN GRAVELS** (LITTLE OR NO FINES)	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO.4 SIEVE SIZE	FOR VISUAL CLASSIFICATION, THE 1/4" SIZE MAY BE USED AS EQUIVALENT TO THE NO.4 SIEVE SIZE	**COARSE-GRAINED SOILS** MORE THAN HALF OF MATERIAL IS LARGER THAN NO.200 SIEVE SIZE	THE NO.200 U.S. STANDARD SIEVE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE
▨	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES					
▨	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	**GRAVELS WITH FINES** (APPRECIABLE AMOUNT OF FINES)				
▨	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES					
▨	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	**CLEAN SANDS** (LITTLE OR NO FINES)	**SANDS** MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO.4 SIEVE SIZE			
▨	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES					
▨	SM	SILTY SANDS, SAND-SILT MIXTURES	**SANDS WITH FINES** (APPRECIABLE AMOUNT OF FINES)				
▨	SC	CLAYEY SANDS, SAND-CLAY MIXTURES					
▨	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	**SILTS & CLAYS** LIQUID LIMIT LESS THAN 50			**FINE-GRAINED SOILS** MORE THAN HALF OF MATERIAL IS SMALLER THAN NO.200 SIEVE SIZE	
▨	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS					
▨	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY					
▨	MH	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF HIGH PLASTICITY	**SILTS & CLAYS** LIQUID LIMIT GREATER THAN 50				
▨	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS					
▨	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS					
▨	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	**HIGHLY ORGANIC SOILS**				

PLASTICITY CHART



KEY TO TEST DATA

TXUU = UNCONSOLIDATED UNDRAINED TRIAXIALTEST

DS = CONSOLIDATED DRAINED DIRECT SHEAR TEST

MC = MOISTURE CONTENT

TD = TOTAL DENSITY

KEY TO SAMPLER TYPE

▧ P = PISTON TUBE SAMPLER

▤ ST = SHELBY TUBE SAMPLER

◨ SPT = SPLIT SPOON SAMPLER

▤ PT = PITCHER TUBE SAMPLER

■ U = DAMES & MOORE TYPE 'U' SAMPLER

▩ NQ = ROCK CORE

SOIL CLASSIFICATION CHART
AND KEY TO TEST DATA

30751-001-003

Dames & Moore, Inc.

KEY TO ROCK CHARACTERIZATION

WEATHERING CODES

F = FRESH

WS = SLIGHTLY WEATHERED

WM = MODERATELY WEATHERED

WH = HIGHLY WEATHERED

WC = COMPLETELY WEATHERED

STRENGTH CODES

VS = VERY STRONG

MS = MODERATELY STRONG

W = WEAK

VW = VERY WEAK

ROCK TYPES

ST = SANDSTONE

SH = SHALE

SL = SILTSTONE

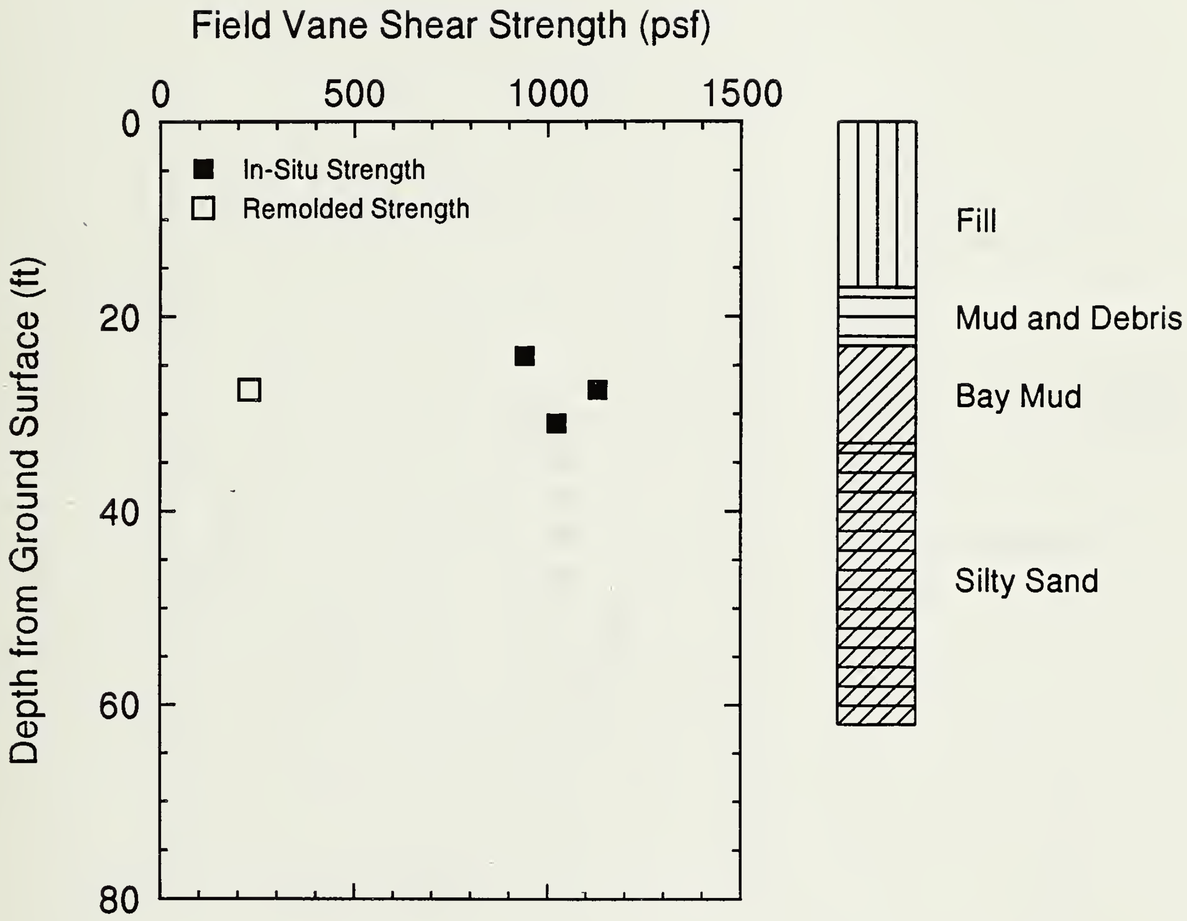
SOIL CLASSIFICATION CHART
AND KEY TO TEST DATA

FIELD VANE SHEAR TESTS

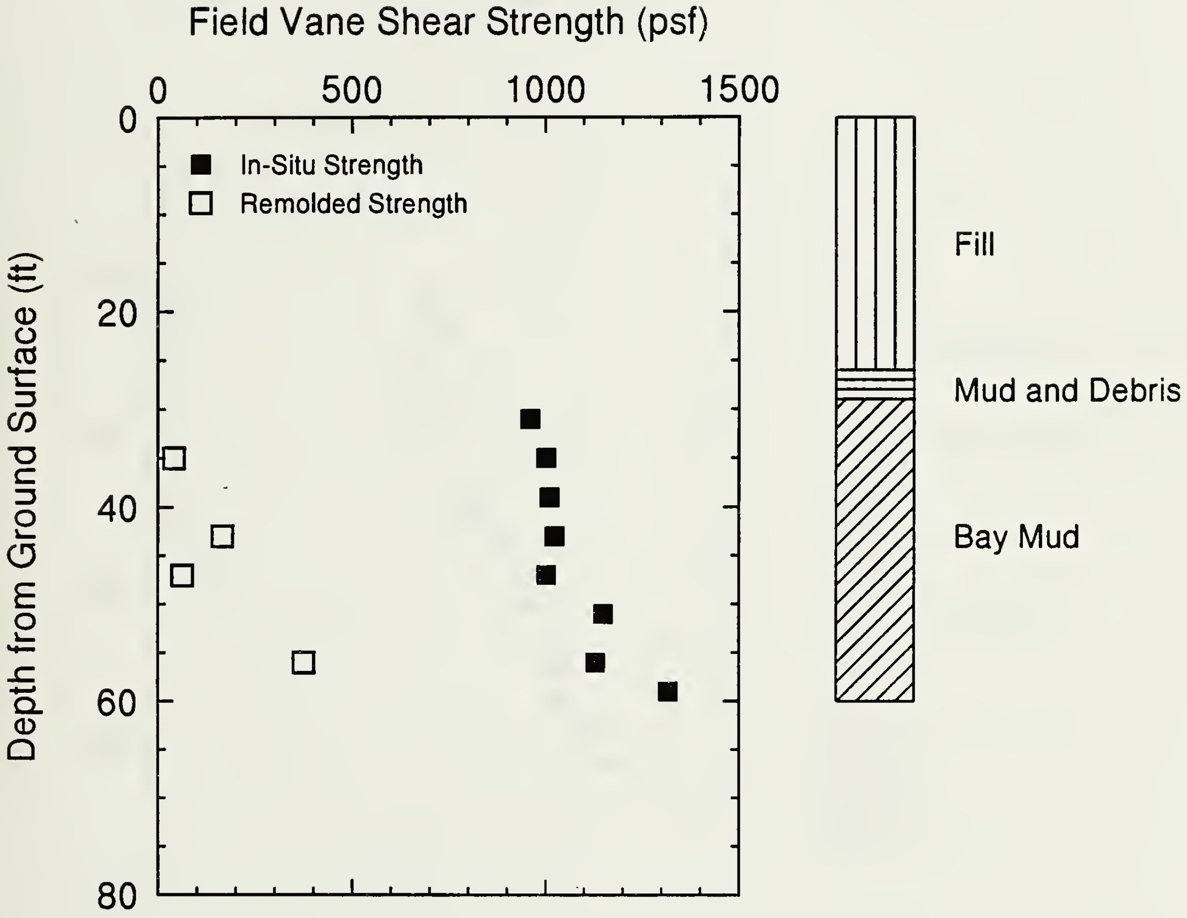
The results of field vane shear tests are presented in the following subsection. Five field vane tests were performed at the locations shown on Plate A-1. The field vane tests ranged from 15.5 feet to 85.5 feet below existing ground surface. The results are shown on Plates A-19 to A-23. On each plate, the undisturbed and remolded shear strengths are tabulated and plotted versus depth. The soil stratigraphy is indicated adjacent to the shear strength plot.

SUMMARY OF FIELD VANE SHEAR TESTS

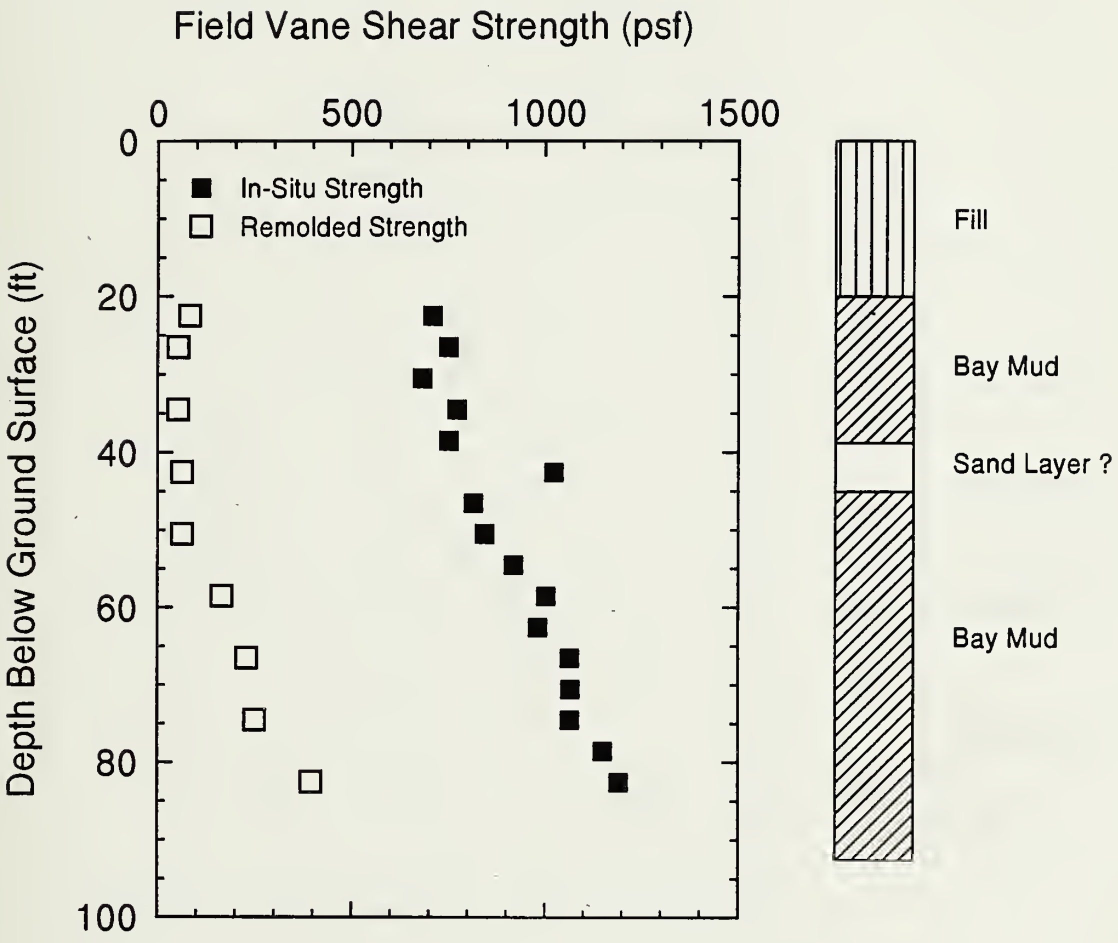
Field Vane Number	Test Depth (ft)	Undisturbed Shear Strength (psf)	Remolded Shear Strength (psf)	Sensitivity
FV-2	24.0	940	-	
	27.5	1129	230	4.9
	31.0	1024	-	
FV-3	31.0	961	-	
	35.0	1003	42	23.9
	39.0	1011	-	
	43.0	1024	167	6.1
	47.0	1003	63	15.9
	51.0	1150	-	
	55.0	1129	376	3.0
	59.0	1317	-	
FV-4	22.5	710	84	8.5
	26.5	752	53	14.2
	30.5	684		
	34.5	773	53	14.6
	38.5	752		
	42.5	1024	63	16.3
	46.5	815		
	50.5	846	63	13.4
	54.5	919		
	58.5	1003	167	6.0
	62.5	982		
	66.5	1065	230	4.6
	70.5	1065		
	74.5	1065	251	4.2
	78.5	1149		
	82.5	1191	369	3.2
FV-5	23.5	731		
	27.5	742	84	8.8
	31.5	742		
	36.0	742	90	8.2
	41.0	951	157	6.1
	45.0	961		
	50.0	815	157	5.2
	54.0	773		
	58.0	877	157	5.9
	63.0	982		
	68.0	982	240	4.1
	85.5	1211	293	4.1
FV-6	15.5	481		
	19.5	460	52	8.9
	23.5	522		
	27.5	627	84	7.5
	31.5	616		
	36.0	888	125	7.1
	40.0	794		



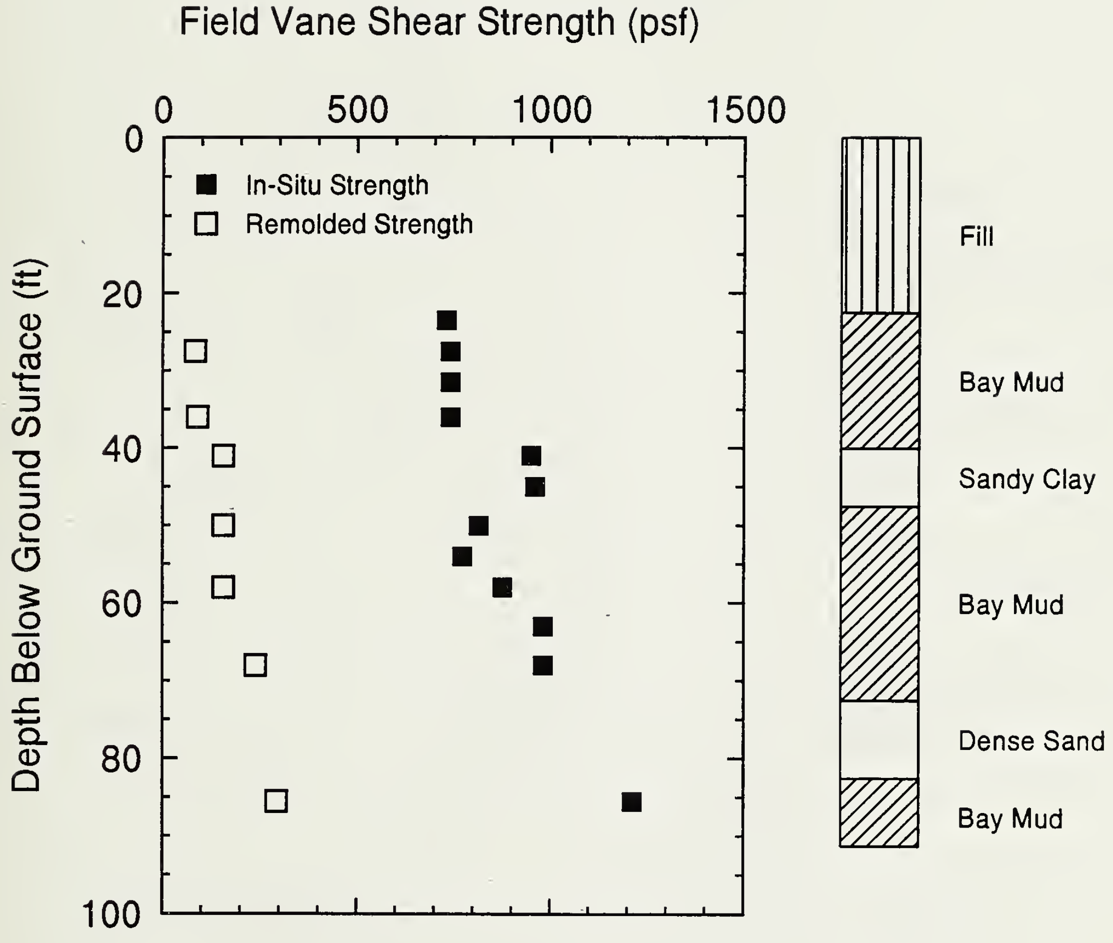
Field Vane FV-2 Test Results



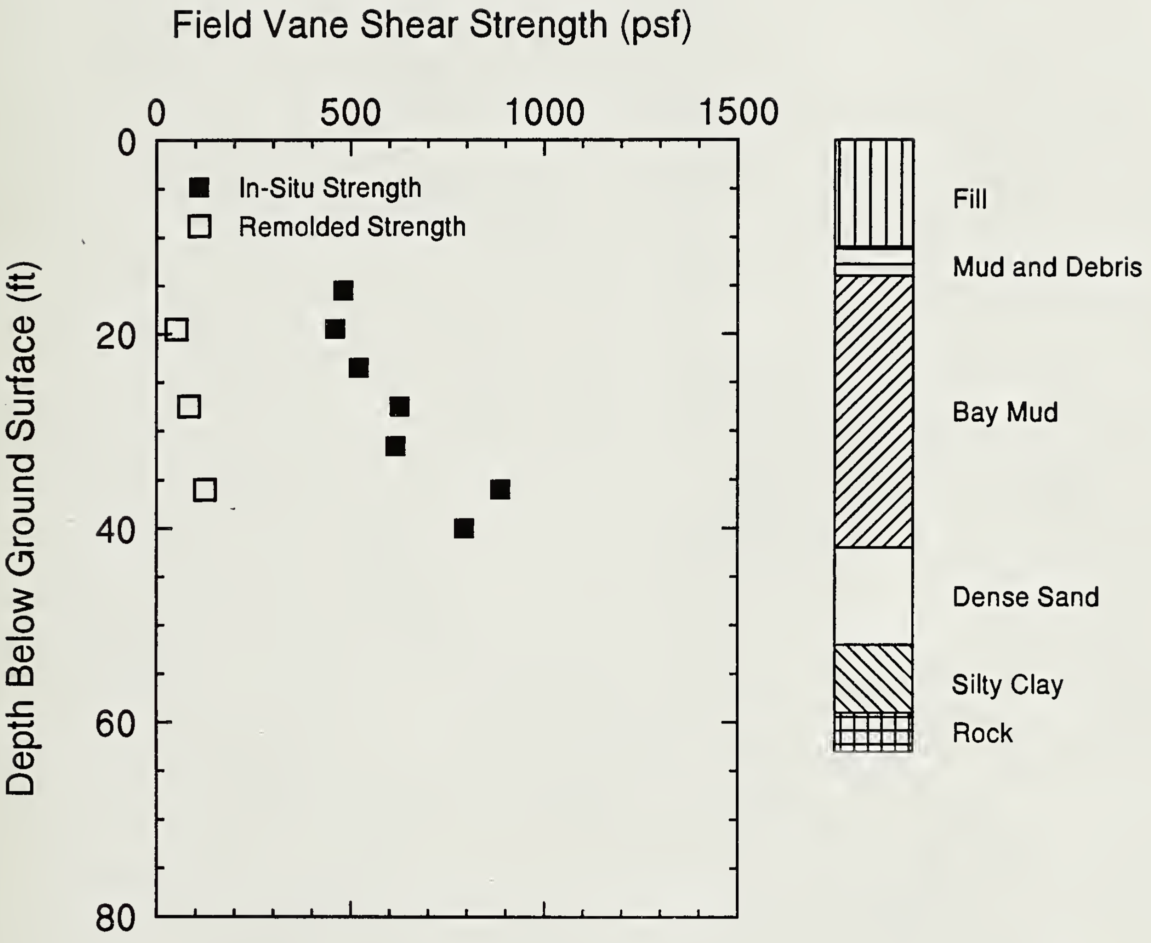
Field Vane FV-3 Test Results



Field Vane FV-4 Test Results



Field Vane FV-5 Test Results



Field Vane FV-6 Test Results

APPENDIX B

LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

TABLE OF CONTENTS

LABORATORY TESTS ON COHESIONLESS SOILS B-1
- Index Tests B-1
- Consolidated Drained Direct Shear Tests B-1

LABORATORY TESTS ON COHESIVE SOILS B-2
- Index Tests B-2
- Consolidation Tests B-2
- Unconsolidated Undrained Triaxial Compression Tests B-3

LABORATORY TESTS ON ROCK SAMPLES B-3

LIST OF PLATES

Plate No.	Title
B-1	Summary of Grain-Size Analysis Results
B-2 to B-10	Grain-Size Distributions
B-11	Summary of Consolidated Drained Direct Shear Test Results
B-12 to B-20	Results of Consolidated Drained Direct Shear Tests
B-21	Summary of Atterberg Limits Test Results
B-22	Summary of Consolidation Test Results
B-23 and B-24	Consolidation Tests
B-25	Summary of Unconsolidated Undrained Triaxial Compression (UUTC) Test Results - Soil Samples
B-26 to B-30	Unconsolidated Undrained Triaxial Compression Tests on Soil Samples
B-31	Summary of Unconfined Compression Tests Results on Rock Samples
B-32 .	Summary of Point Load Test Results on Rock Samples
B-33	Summary of UUTC Test Results - Rock Samples
B-34 to B-41	Unconsolidated Undrained Triaxial CompressionTests on Rock Core Specimens

APPENDIX B

LABORATORY TESTING

An extensive laboratory testing program was carried out to determine the index and engineering properties of the major subsurface strata encountered within the different sections of the proposed alignment.

The laboratory testing program included conventional tests to confirm the existing information on the engineering characteristics of the major strata and to refine some of the engineering parameters where it was deemed appropriate. These tests were performed at Dames & Moore's San Francisco laboratory. In addition, tests on rock samples were performed by Advanced Terra Testing, of Lakewood, Colorado, to evaluate the strength characteristics of the rock encountered in the exploratory borings.

This appendix briefly describes the testing program and procedures for the different types of tests, then presents detailed test results. For presentation purposes, the laboratory tests are divided into tests on cohesive soils, tests on cohesionless soils, and tests on rock.

LABORATORY TESTS ON COHESIONLESS SOILS

Cohesionless soils encountered at the proposed alignment are comprised of the fill, and Upper and Lower Sands. Both index tests and strength tests were performed on representative samples of the major cohesionless strata as described below.

Index Tests

Index tests included grain-size analyses, moisture content and dry density determinations. The moisture content tests were performed in accordance with the ASTM 2216-90. Total and dry density tests were carried out following the procedure in the ASTM D 2937-83 Standard. Grain-size analyses were performed in accordance with the ASTM D 422-63 Standard, while fines content tests were performed in accordance with the ASTM 1140-54 Standard.

The measured moisture content and dry densities are indicated on the Logs of Borings (Plates A-2 through A-11) adjacent to the appropriate sample depth. A summary of the grain-size

analyses is shown on Plate B-1. The results of the sieve analyses are shown graphically as grain-size distribution curves on Plates B-2 through B-10.

Consolidated Drained Direct Shear Tests

Nine consolidated drained direct shear (CDDS) tests were performed on reasonably undisturbed samples of Fill, Upper Sands, and Older Alluvial deposits to evaluate the deformation and strength properties of these strata.

The tests were carried out in accordance with the ASTM D 3080-90 Specification. The test specimens, approximately 2.4 inches in diameter and 1 inch tall, were first consolidated to the required consolidation stress and then sheared at a constant rate of deformation of 0.05 inch/hour; given the granular nature of the soils tested, this rate is slow enough to model drained behavior. Each test was run at two or three applied normal stresses at the range of interest such that strength parameters (cohesive intercept and friction angle) can be estimated.

The results of the CDDS tests are summarized on Plate B-11, which includes relevant test information and index properties. Plates B-12 through B-20 present the summary of plots of these test. Results include plots of maximum shear stress versus applied normal stress. Plates are arranged in the same order as they appear on the summary table.

LABORATORY TESTS ON COHESIVE SOILS

The laboratory tests performed on the cohesive soils fall in three general groups: index tests, consolidation tests, and strength tests. The test program, procedures, and test results for each group are presented below.

Index Tests

Index tests were performed to aid soil classification and for correlation with engineering properties. They include: Atterberg Limits (liquid and plastic limits), natural moisture content and total unit weights. These tests were performed in accordance with the following Caltrans or ASTM Standards:

Moisture Content	ASTM D 2216-90
Dry Density	ASTM D 2937-83
Atterberg Limits	ASTM D 4318-84

The results of all index tests are indicated on the Logs of Borings (Plates A-2 through A-11) adjacent to the appropriate sample depth. In addition, the Atterberg Limits data are tabulated on Plate B-21. Index tests were routinely performed on most samples which were tested for engineering property determination. The results of these index tests are summarized together with the results of the engineering tests in subsequent sections of this appendix.

Consolidation Tests

Two consolidation tests on Old Bay Clay samples were performed in general accordance with the procedures outlined in Lambe (1961) and the ASTM D 2435-90 Standard. However, small consolidation stress increments were applied until the specimen was compressed into the virgin compression zone. The purpose of this procedure was to refine the estimate of the maximum past pressure.

In the recompression zone, load increments were applied until 90% consolidation was achieved plus one hour. In the virgin compression zone, the load increments were generally doubled with load duration periods of 24 hours.

Plate B-22 presents the results of consolidation tests on samples of Old Bay Clay and the compression curves (vertical strain at the end of load increment versus log effective stress and coefficient of vertical consolidation versus the log of effective stress) are plotted on Plates B-23 and B-24.

The maximum past pressure values (σ'_{vm}) tabulated on Plate B-22 were estimated using the Casagrande construction and the end-of-primary-consolidation compression curve. The overconsolidation ratio (*OCR*) was then computed from an estimated maximum past pressure σ'_{vm} and the calculated in-situ vertical effective stress σ'_{vo} at the depth from which the sample was taken using the following expression:

$$OCR = \sigma'_{vm}/\sigma'_{vo}$$

The compressibility parameters, Compression Ratio (CR), Swelling Ratio (SW), and Recompression Ratio (RR) were also computed from the end-of-primary-consolidation compression curves and are also tabulated on Plate B-22. The compression ratio, CR, is the slope

of the compression curve (when plotted versus log stress) in the virgin compression zone. The recompression ratio, RR, is the slope during the reloading portion of the test and the swelling ratio is the slope of the unloading portion of the compression curve.

Unconsolidated Undrained Triaxial Compression Tests

A series of Unconsolidated Undrained Triaxial Compression Tests (UUTC) was performed on selected samples of Bay Mud, Old Bay Clay, and stiff clay lenses. The tests were performed in accordance with the procedures in the ASTM D 2850-87 Standard. The test specimens were nominally 6 inches in height; no trimming was performed. Each test specimen was enclosed in a rubber membrane. Most of the samples were tested at confining pressures approximately equal to the total overburden pressure, although some samples were tested at confining pressures approximately equal to the effective overburden pressure. Pitcher samples of Bay Mud, Old Bay Clay, and stiff clay lenses were used to perform the UUTC tests.

The results of UUTC tests on soil samples are summarized on Plate B-25. Plots of deviator stress versus axial strain for each test are presented on Plates B-26 through B-30. These plates are arranged in the order in which the tests appear on the summary table.

LABORATORY TESTS ON ROCK SAMPLES

Sixteen unconfined compression tests and 27 point load tests were performed on rock samples by Advanced Terra Testing, Inc. of Lakewood, Colorado. The unconfined compression tests were performed according to the ASTM standard D 2938-86. In addition, UUTC tests were performed on soft rock samples in Dames & Moore's laboratory. The triaxial test were run at a confining pressure roughly equal to the total overburden pressure at the depth where the samples were obtained.

Results of the unconfined compression tests are summarized on Plate B-31, while the results of point load tests are presented on Plate B-32. The results of the UUTC tests are summarized on Plate B-33. Plots of deviator stress versus axial strain for each UUTC test are presented on Plates B-34 through B-41.

-oOo-

The following subsections present the results of our laboratory testing. The laboratory testing consisted of:

- grain-size analyses
- consolidated drained direct shear tests
- Atterberg limits tests
- consolidation tests
- unconsolidated undrained triaxial compression tests
- laboratory tests on rock samples

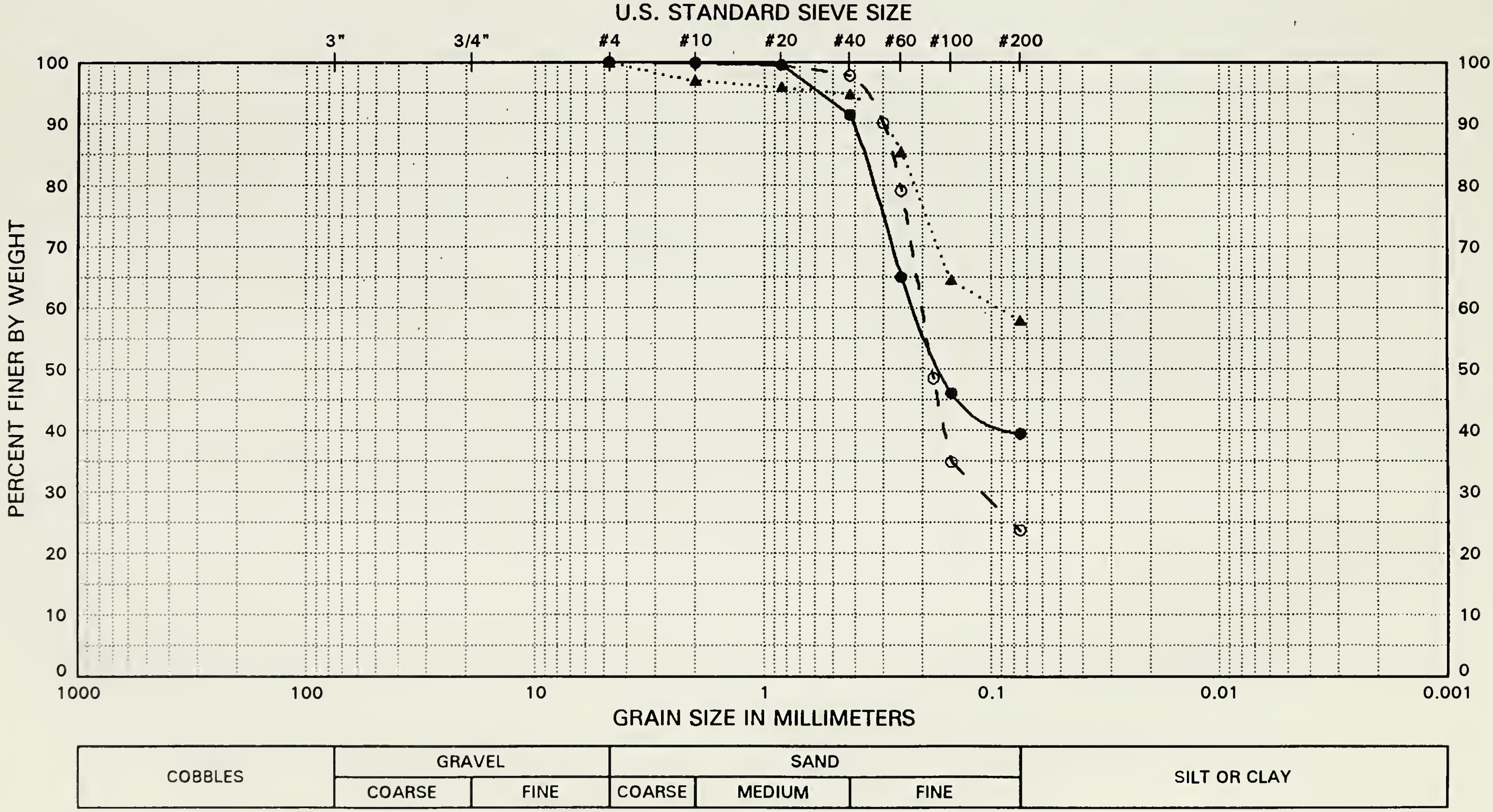
GRAIN-SIZE ANALYSIS

The results of the grain-size analyses are presented in the following subsection. Grain-size analyses were performed on twenty-three samples of the cohesionless soils. A summary of the results is presented on Plate B-1. The individual grain-size distribution curves for each of the twenty-three samples are shown on Plates B-2 through B-10.

SUMMARY OF GRAIN-SIZE ANALYSIS

Soil Unit	Boring Number	Sample Depth (ft)	Material Type	Percent Fines	Comments
Fill	B-4	5	SC	21.0	
	B-5	15	SP	1.3	
Upper Sands with Clay Lenses	B-3	20	CL	58.9	
	B-3	30	SM/SC	17.3	
	B-4	30	SP/SM	7.2	
	B-5	25	SP	4.2	
	B-5	31.5	SM/SC	16.0	
	B-5	35.5	SP	5.0	
	B-5	45	SP/SM	6.0	
	B-5	50	SP/SM	12.3	
	B-5	60	SP/SM	9.7	
	B-5	85	SM	25.4	
	B-5	95	SP/SM	8.7	
	B-8	15	SM	16.8	
	B-8	20	SC	46.6	
	B-11	41	SM	13.1	
	B-11	56	SP-SM	10.9	
Older Alluvial Deposits	B-1	20	SC	39.4	
	B-1	30	SM/SC	23.7	
	B-1	35	CL	57.5	Fines Contents Only
	B-1	40	SM	15.0	Fines Contents Only
	B-1	45	SP/SM	9.7	
	B-1	50	SC	39.6	Fines Contents Only
	B-1	55	SM	24.9	
	B-1	60	SM	18.2	
Lower Sands and Clays	B-5	120	SC	29.0	
	B-5	130	SP/SM	9.8	Fines Contents Only

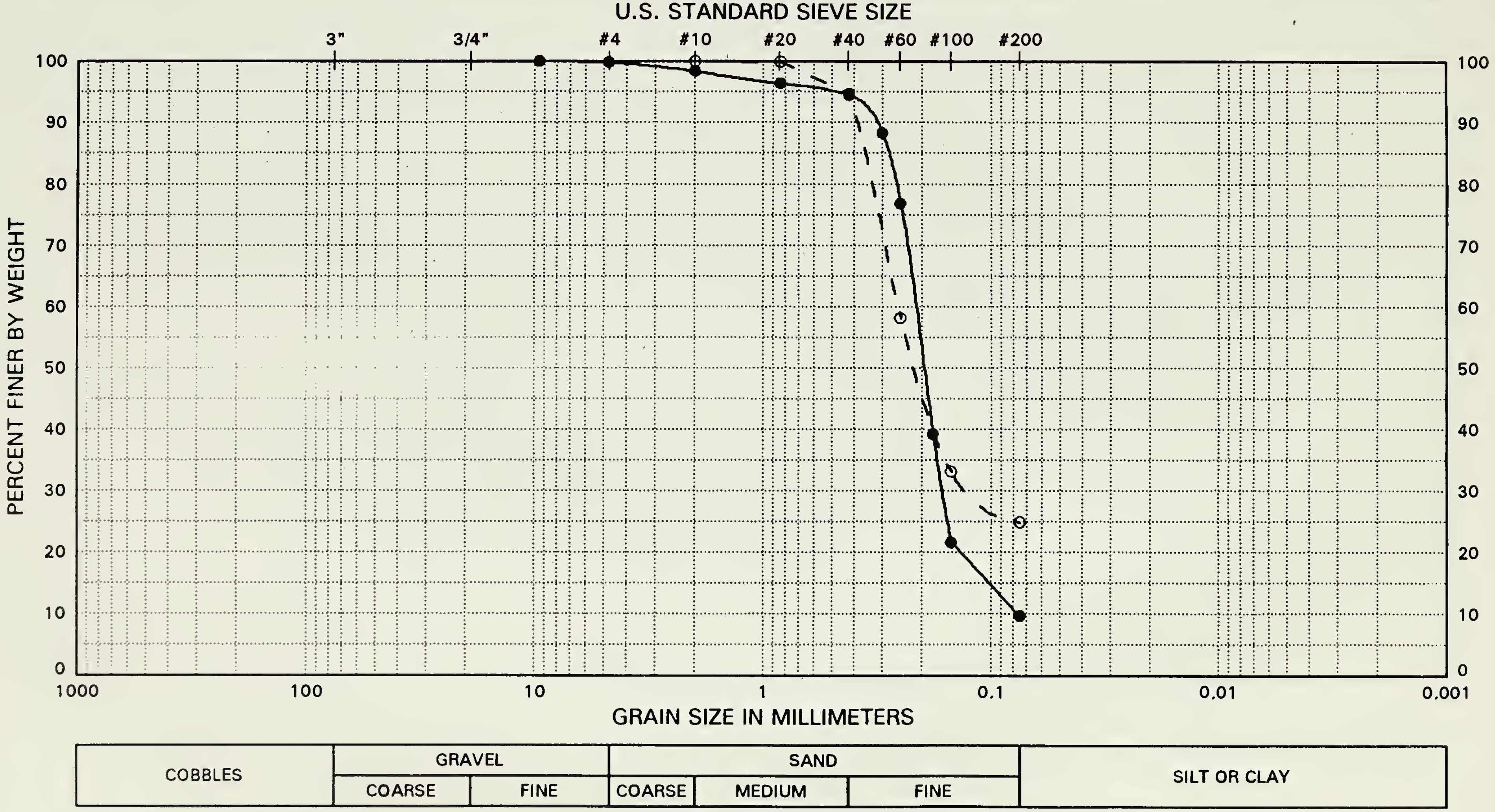
KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	B-1	20.0		4			SC	
⊙	B-1	30.0		6			SM/SC	
▲	B-1	35.0		7			CL	



GRAIN-SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003
Dames & Moore, Inc.

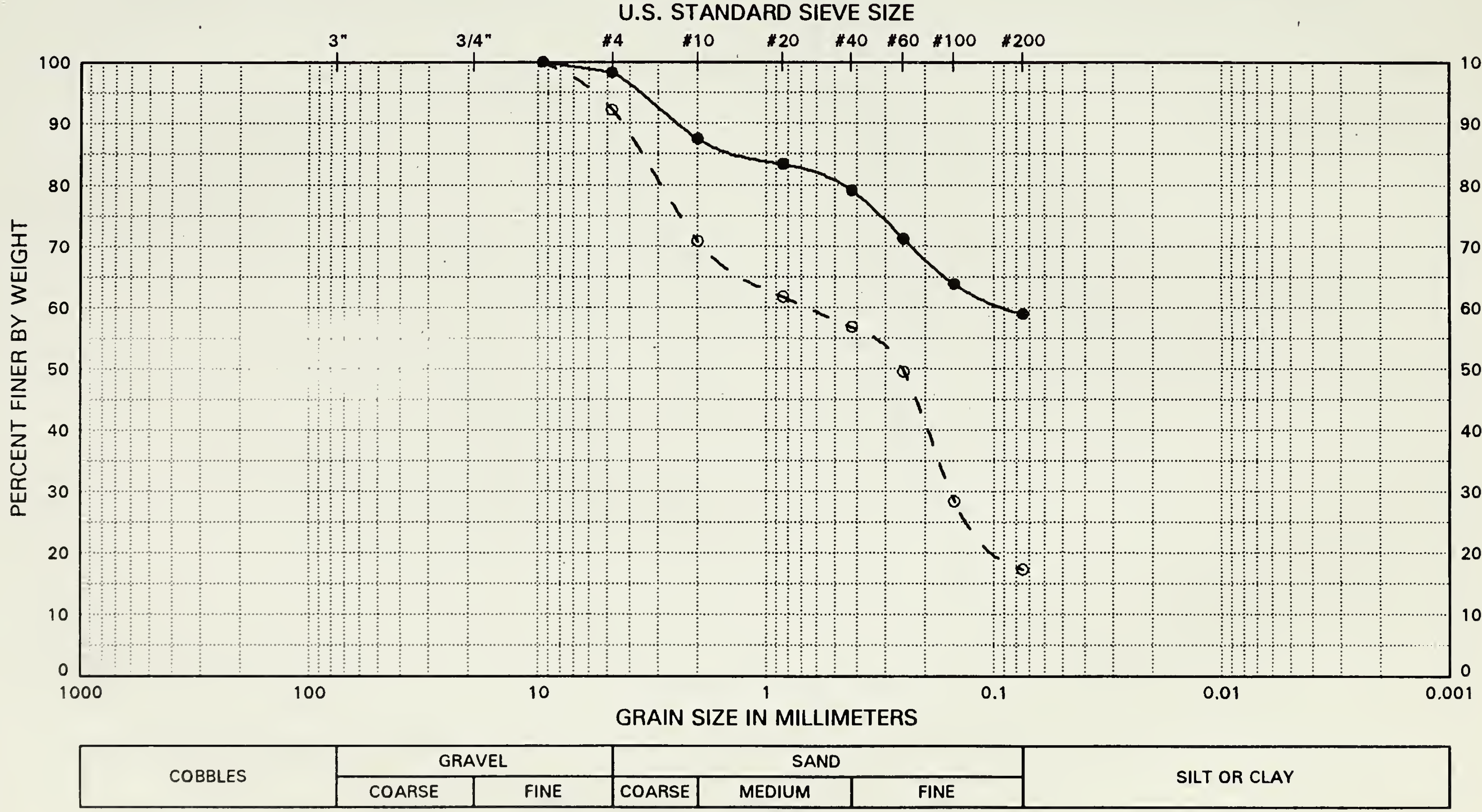
KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	**B-1**	**45.0**		9			SP/SM	
⊙	**B-1**	**55.0**		11			SM	



GRAIN-SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003
Dames & Moore, Inc.

KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	B-3	20.0		4			CL	
⊙	B-3	30.0		6			SM/SC	



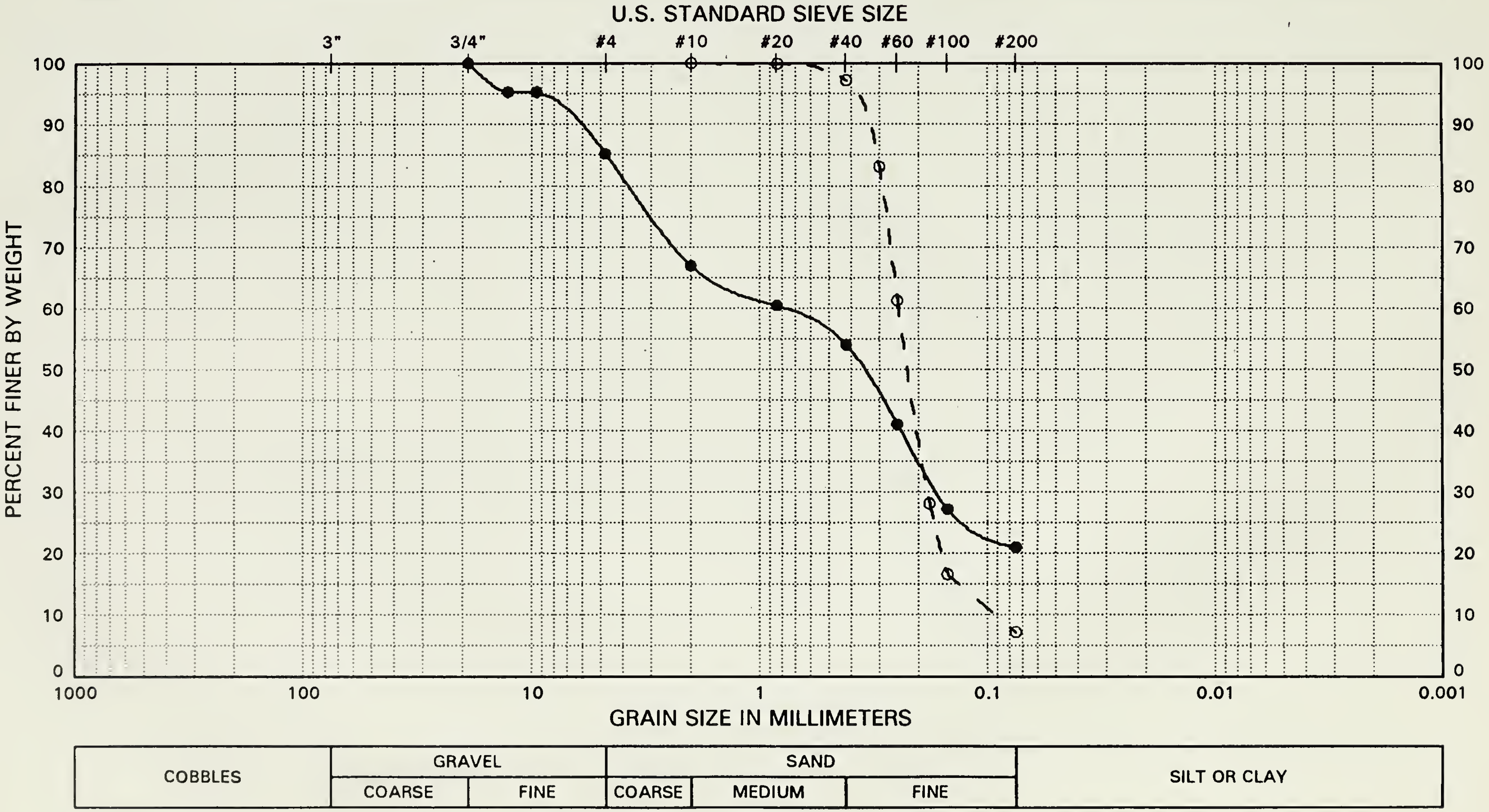
GRAIN-SIZE DISTRIBUTION

(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003

Dames & Moore, Inc.

KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	B-4	5.0		1			SC	
○	B-4	30.0		6			SP-SM	

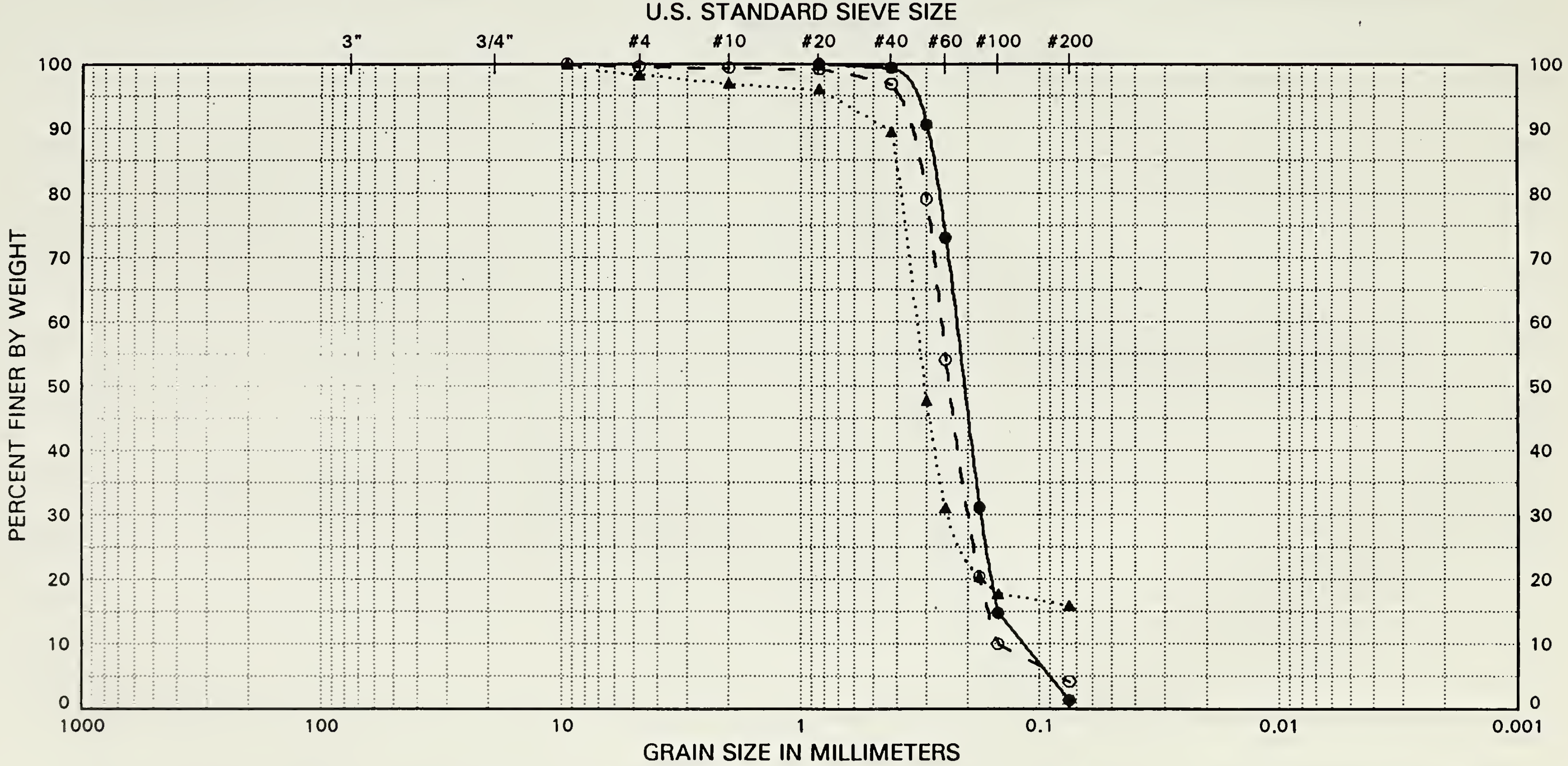


GRAIN-SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003

Dames & Moore, Inc.

KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	B-5	15.0		3			SP	
⊙	B-5	25.0		5			SP	
▲	B-5	31.5		6			SM/SC	

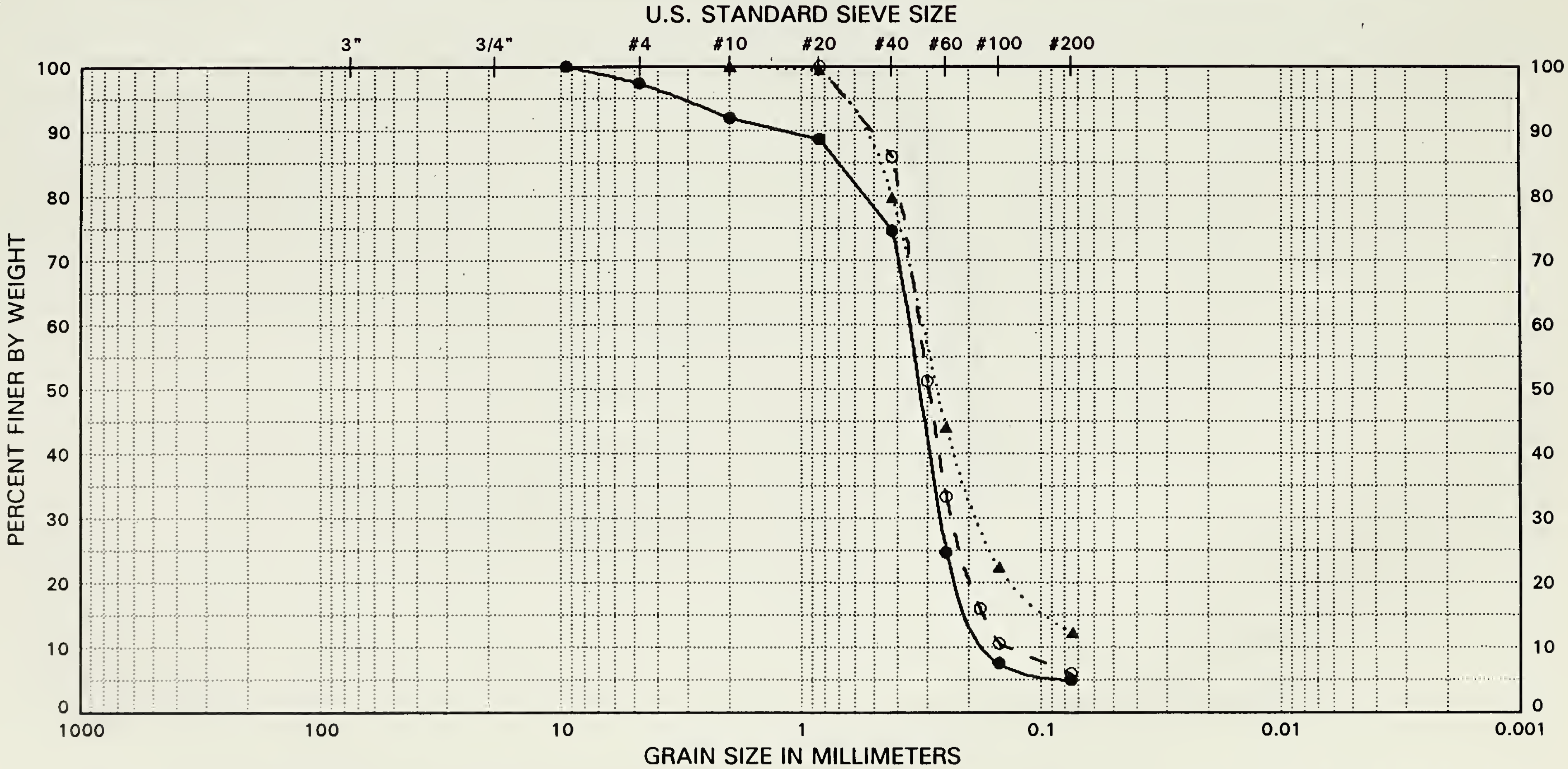


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRAIN-SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003
Dames & Moore, Inc.

KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	B-5	35.5		7			SP	
⊙	B-5	45.0		9			SP-SM	
▲	B-5	50.0		10			SP-SM	

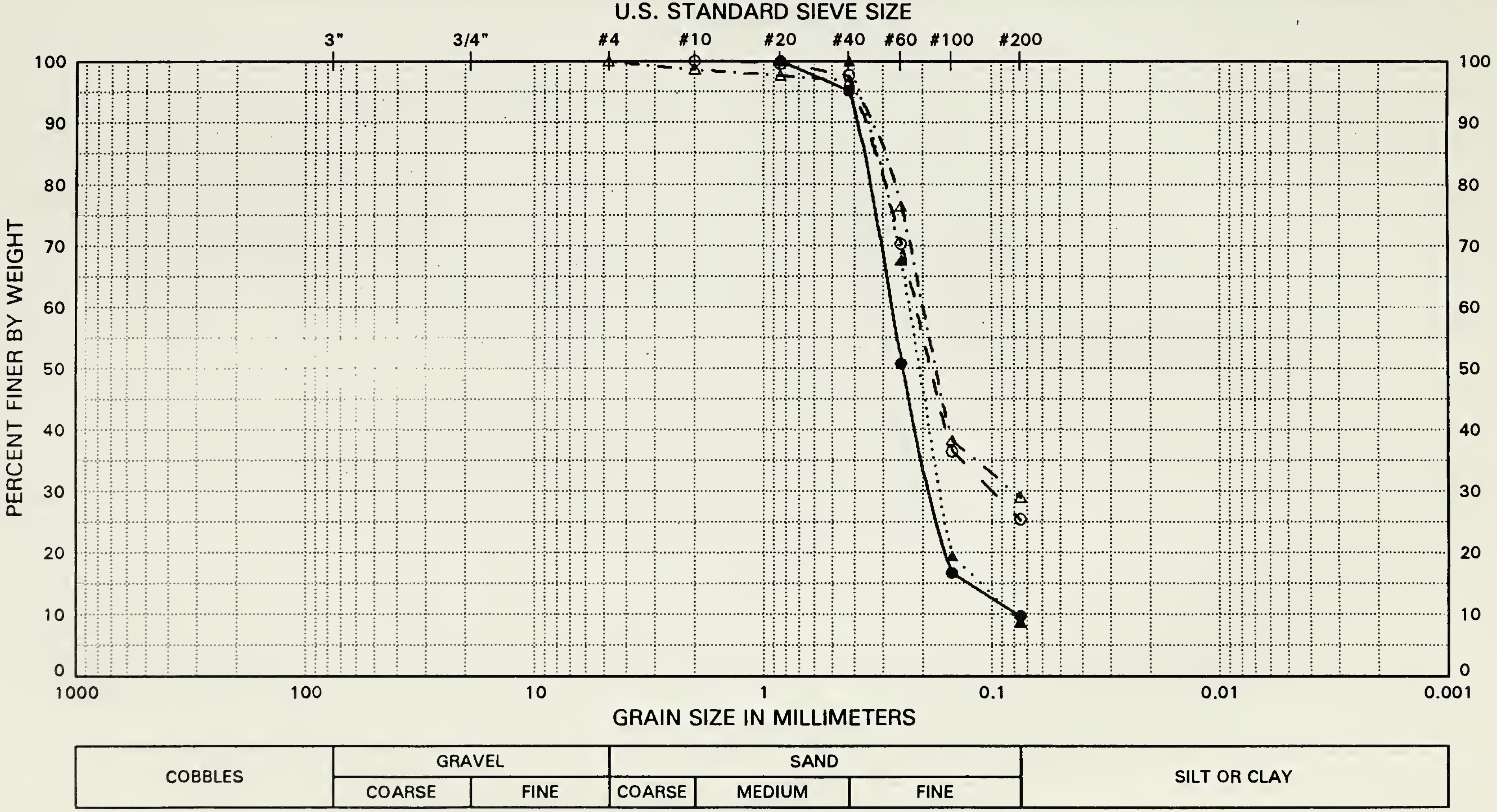


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRAIN-SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003
Dames & Moore, Inc.

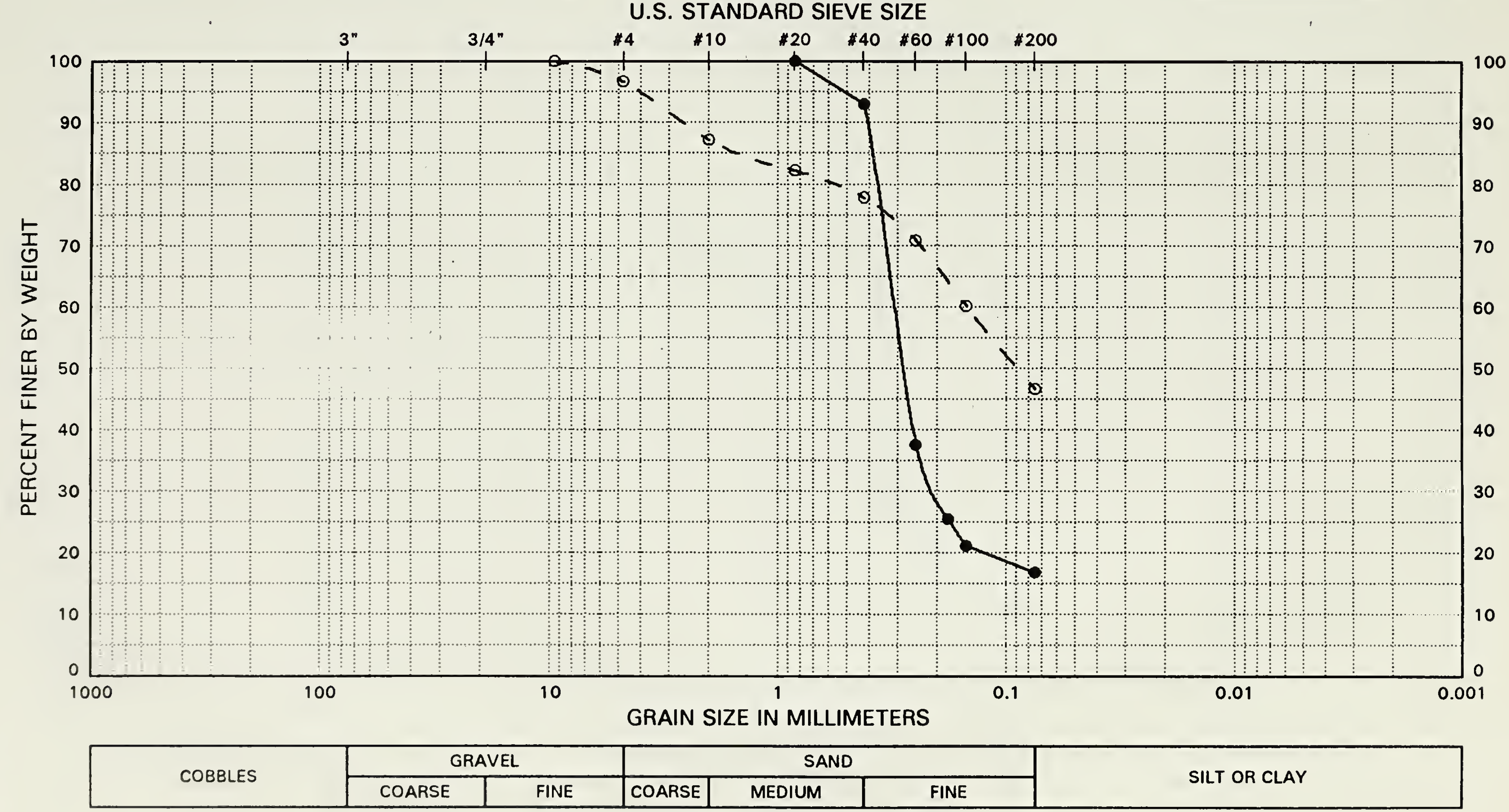
KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	**B-5**	**60.0**		12			SP-SM	
⊙	**B-5**	**85.0**		17			SM	
▲	**B-5**	**95.0**		19			SP-SM	
△	**B-5**	**120.0**		24			SC	



GRAIN-SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003
Dames & Moore, Inc.

KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	B-8	15.0		3			SM	
⊙	B-8	20.0		4			SC	



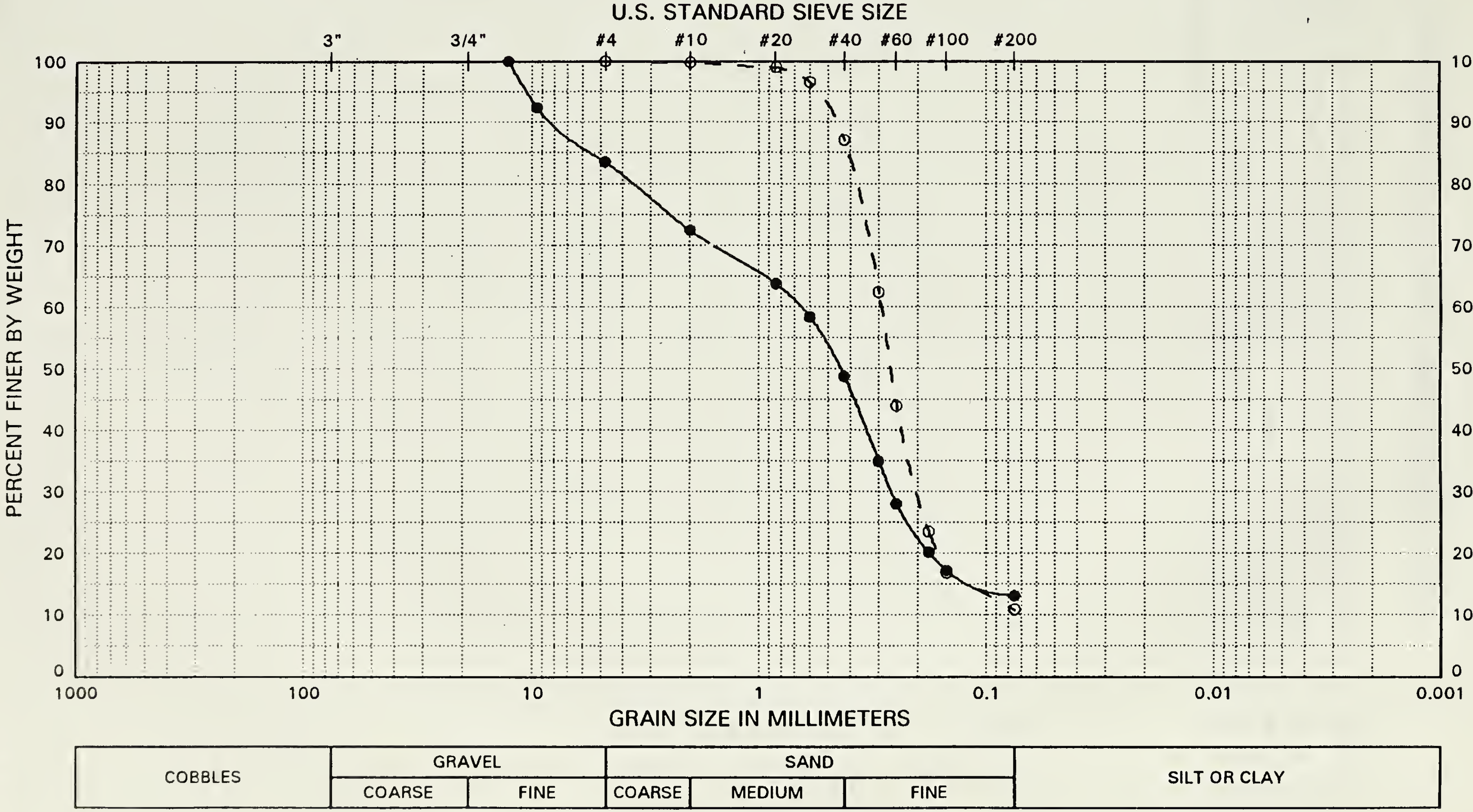
GRAIN-SIZE DISTRIBUTION

(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003

Dames & Moore, Inc.

KEY	BORING	DEPTH, ft	ELEV.	SAMPLE	LIQUID LIMIT	PLASTIC LIMIT	SYMBOL	SOIL CLASSIFICATION
●	B-11	41.0		16			SM	
○	B-11	56.0		20			SP-SM	



GRAIN-SIZE DISTRIBUTION
(UNIFIED SOIL CLASSIFICATION SYSTEM)

30751-001-003
Dames & Moore, Inc.

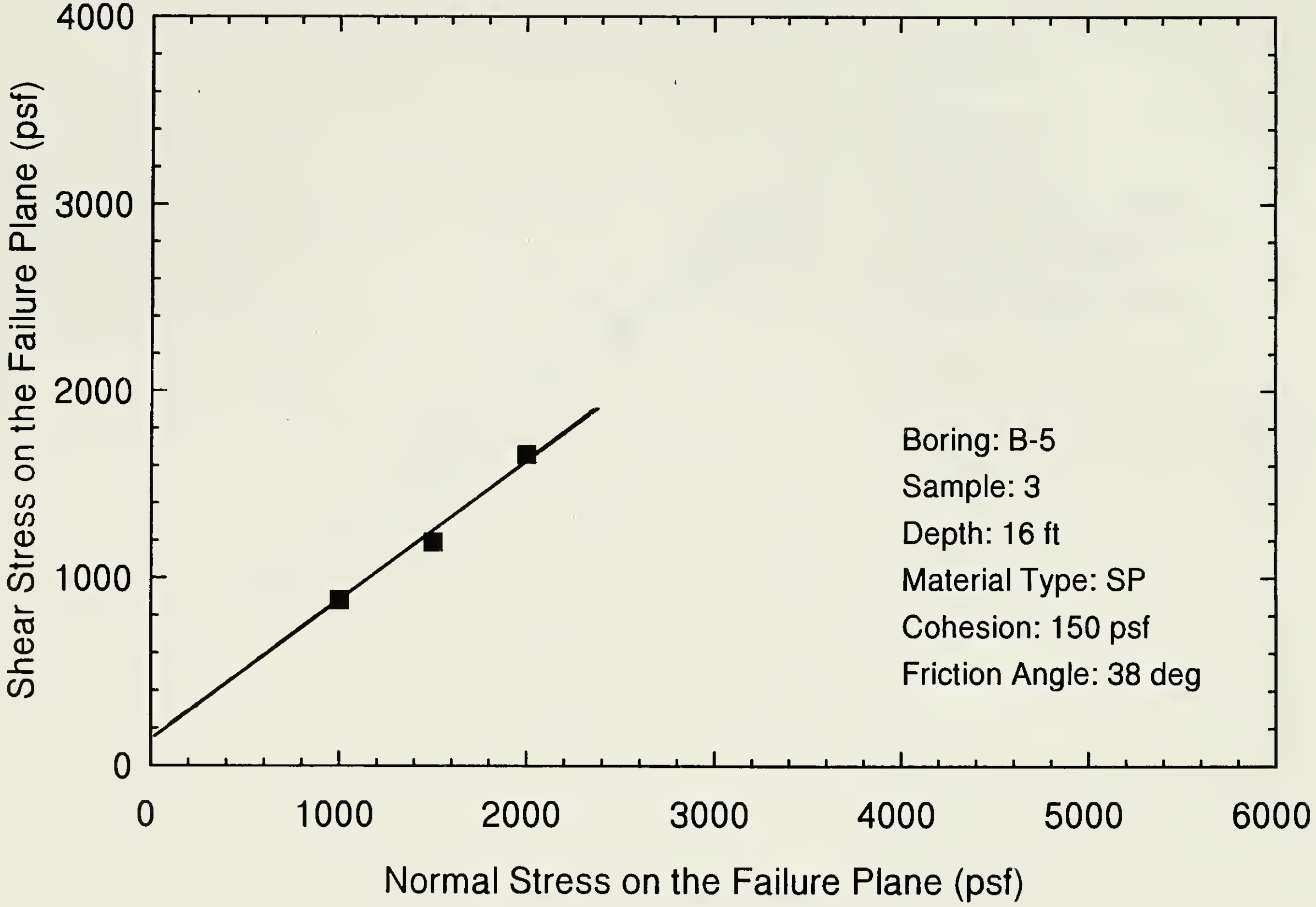
CONSOLIDATED DRAINED DIRECT SHEAR TESTS

The results of the consolidated drained direct shear tests are presented in the following subsection. A total of nine direct shear tests were performed on selected samples of Upper and Lower sands at different vertical effective pressures. A summary of the results is presented on Plate B-11. Plots of maximum shear stress versus applied normal stress for each test are presented on Plates B-12 through B-20.

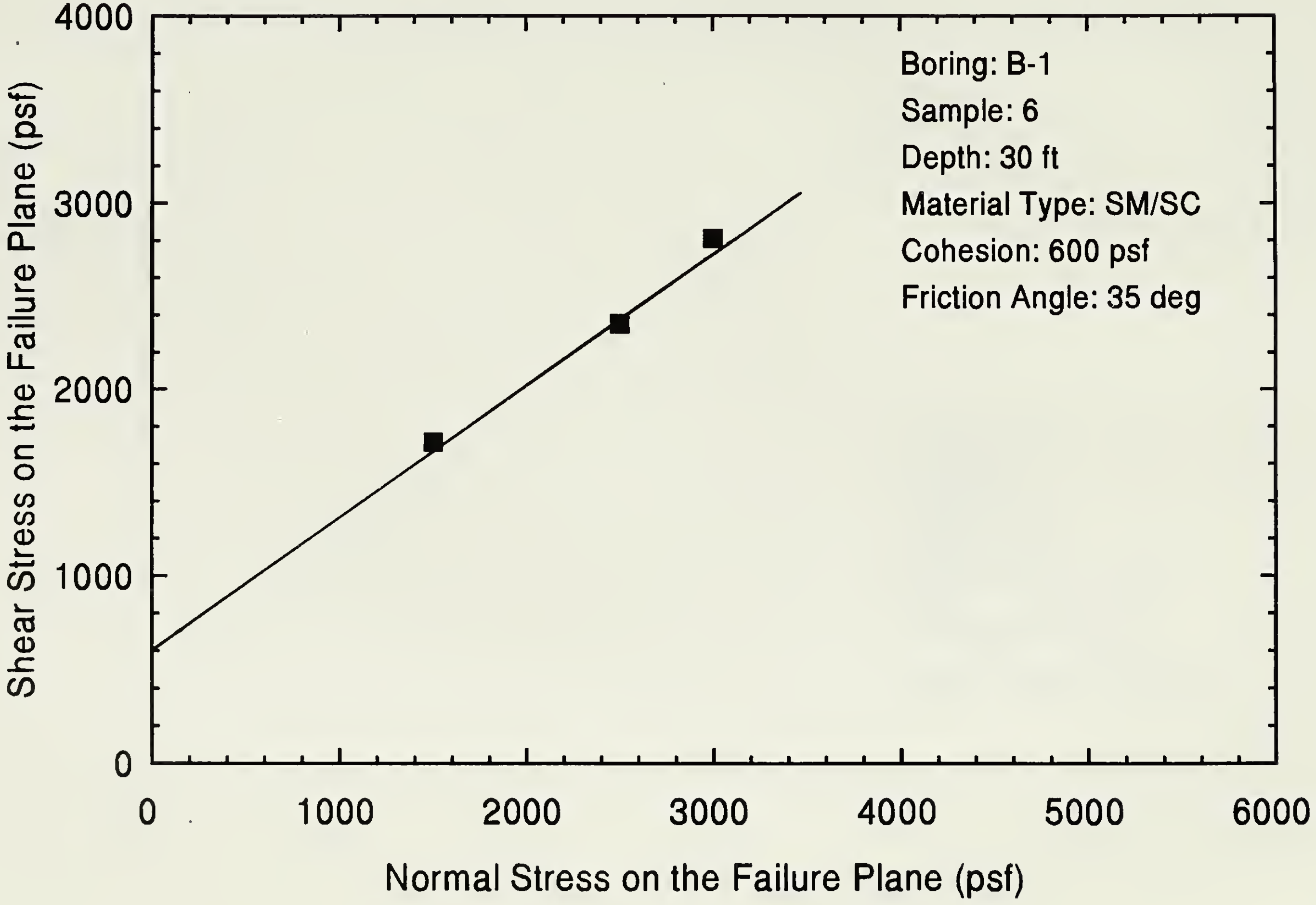
SUMMARY OF CONSOLIDATED DRAINED DIRECT SHEAR TESTS

Soil Unit	Boring No.	Sample Depth (ft)	Soil Type	Fines Content (%)	Moisture Content (%)	Total Unit Weight (pcf)	Vertical Consolidation Stress (psf)	Maximum Shear Stress (psf)	Horizontal Deflection of Max Shear Stress (in)
Fill	B-5	16	SP	1.3	18.7 20.4 21.1	123.2 129.4 130.4	1000 1500 2000	883 1193 1662	0.065 0.065 0.059
Older Alluvial Deposits	B-1	30	SM/SC	23.7	17.6 16.1 18.9	130.6 127.9 131.3	1500 2500 3000	1719 2351 2808	0.081 0.074 0.075
	B-1	45	SM	9.7	19.1 21.0 23.4	128.8 130.6 125.6	2000 3000 4000	1941 2683 3353	0.078 0.042 0.090
	B-8	15	SM/SC	16.8	16.8 19.1	133.1 124.8	1000 2000	1064 1584	0.074 0.095
Upper Sands with Clay Lenses	B-4	30	SM	7.2	23.4 22.7	128.7 127.7	1500 3000	1728 3685	0.038 0.039
	B-5	25	SP	4.2	19.4 20.0 19.2	128.2 129.0 129.7	1500 2500 3000	1349 2169 2905	0.061 0.054 0.094
	B-5	31.5	SM/SC	16.0	31.8 23.9 22.5	124.2 126.0 127.0	1500 2500 3000	1130 1618 1202	0.122 0.121 0.031
	B-5	45	SP/SM	6.0	22.9 21.7 23.6	125.0 126.6 125.1	2000 3000 4000	2179 2993 3722	0.052 0.055 0.071
	B-11	56	SP/SM	10.9	16.5 18.9 17.0	133.1 130.4 132.3	2500 4000 5000	2542 3240 4423	0.050 0.059 0.067

CONSOLIDATED DRAINED DIRECT SHEAR TEST

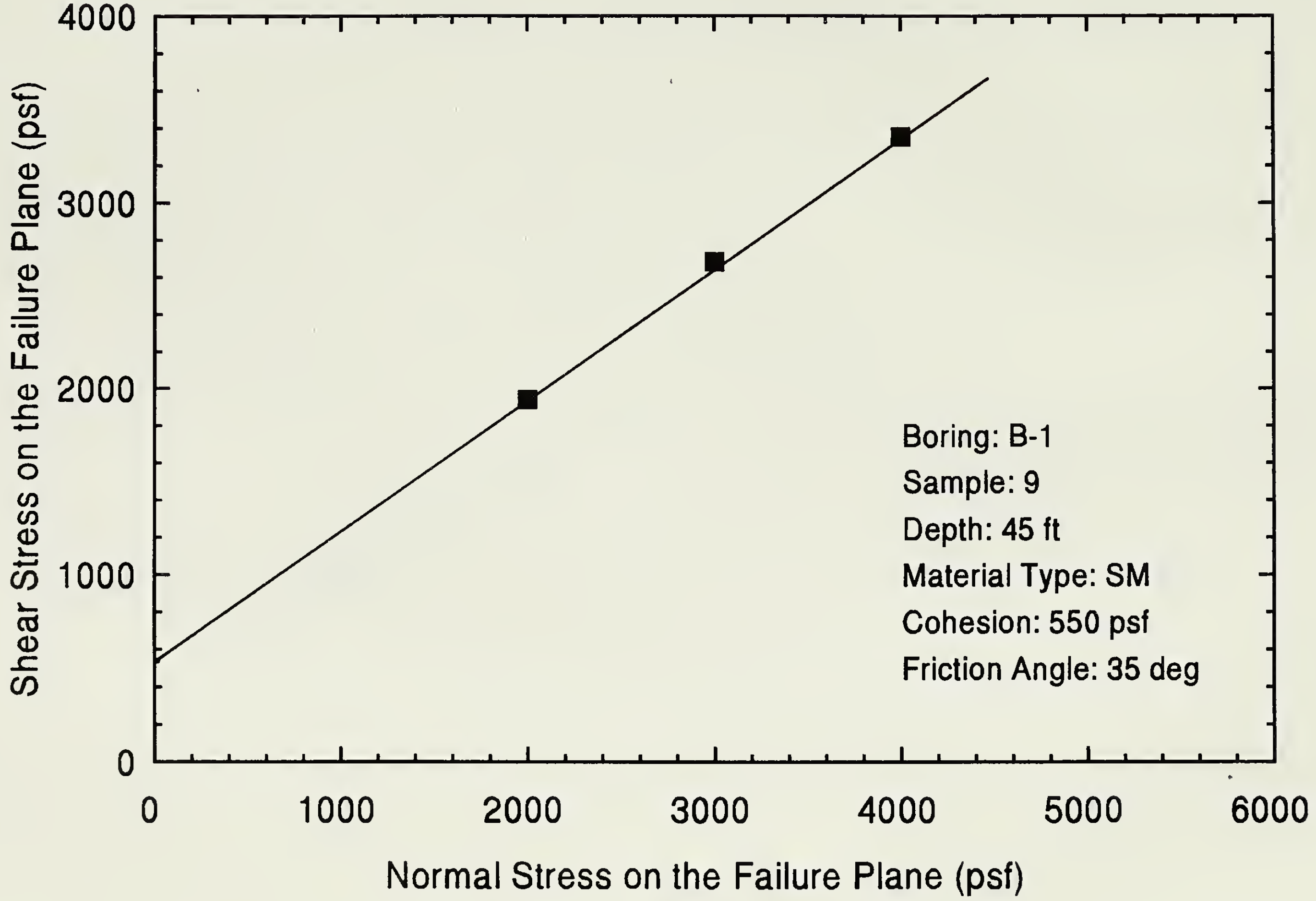


CONSOLIDATED DRAINED DIRECT SHEAR TEST



Boring: B-1
Sample: 6
Depth: 30 ft
Material Type: SM/SC
Cohesion: 600 psf
Friction Angle: 35 deg

CONSOLIDATED DRAINED DIRECT SHEAR TEST



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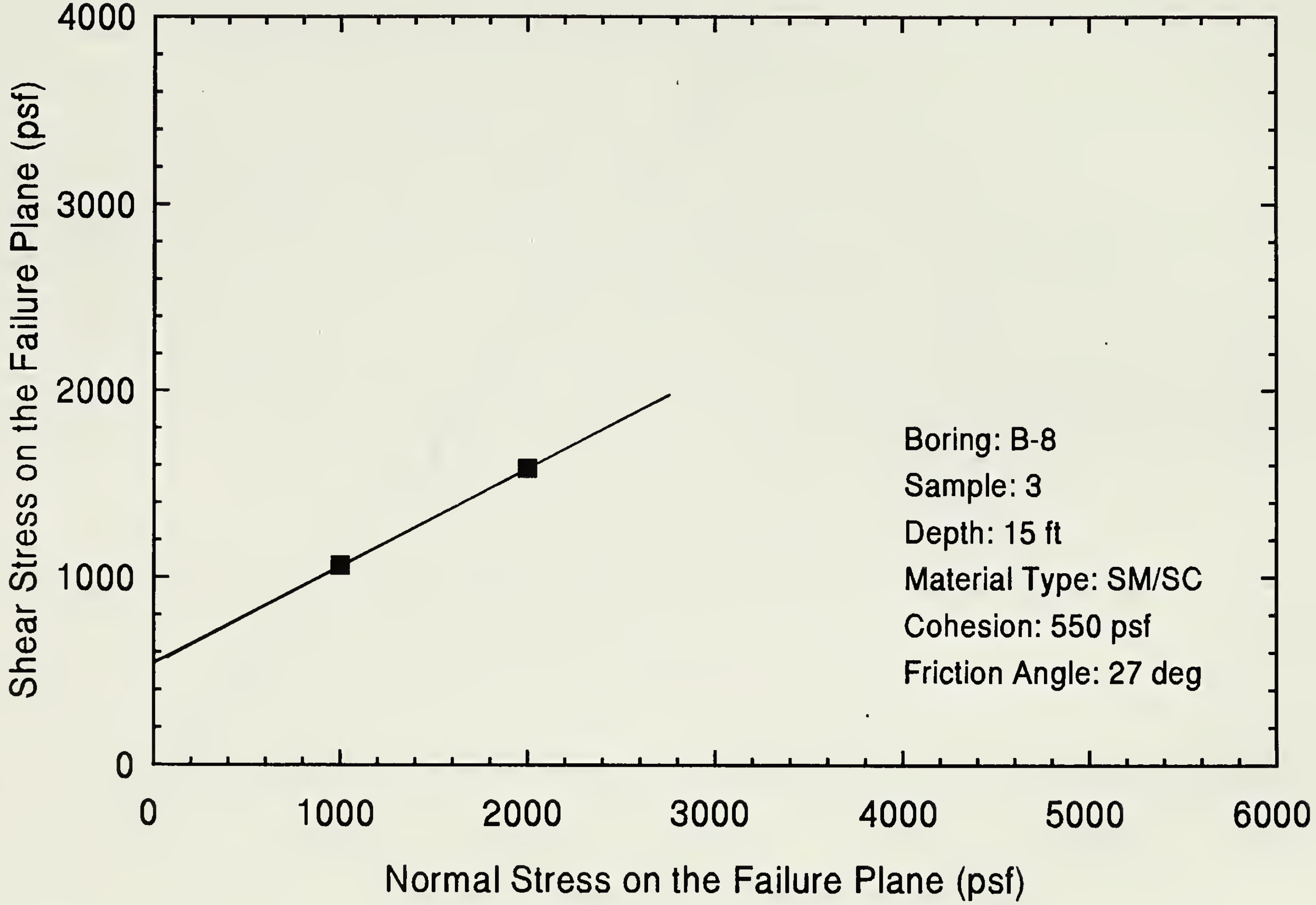

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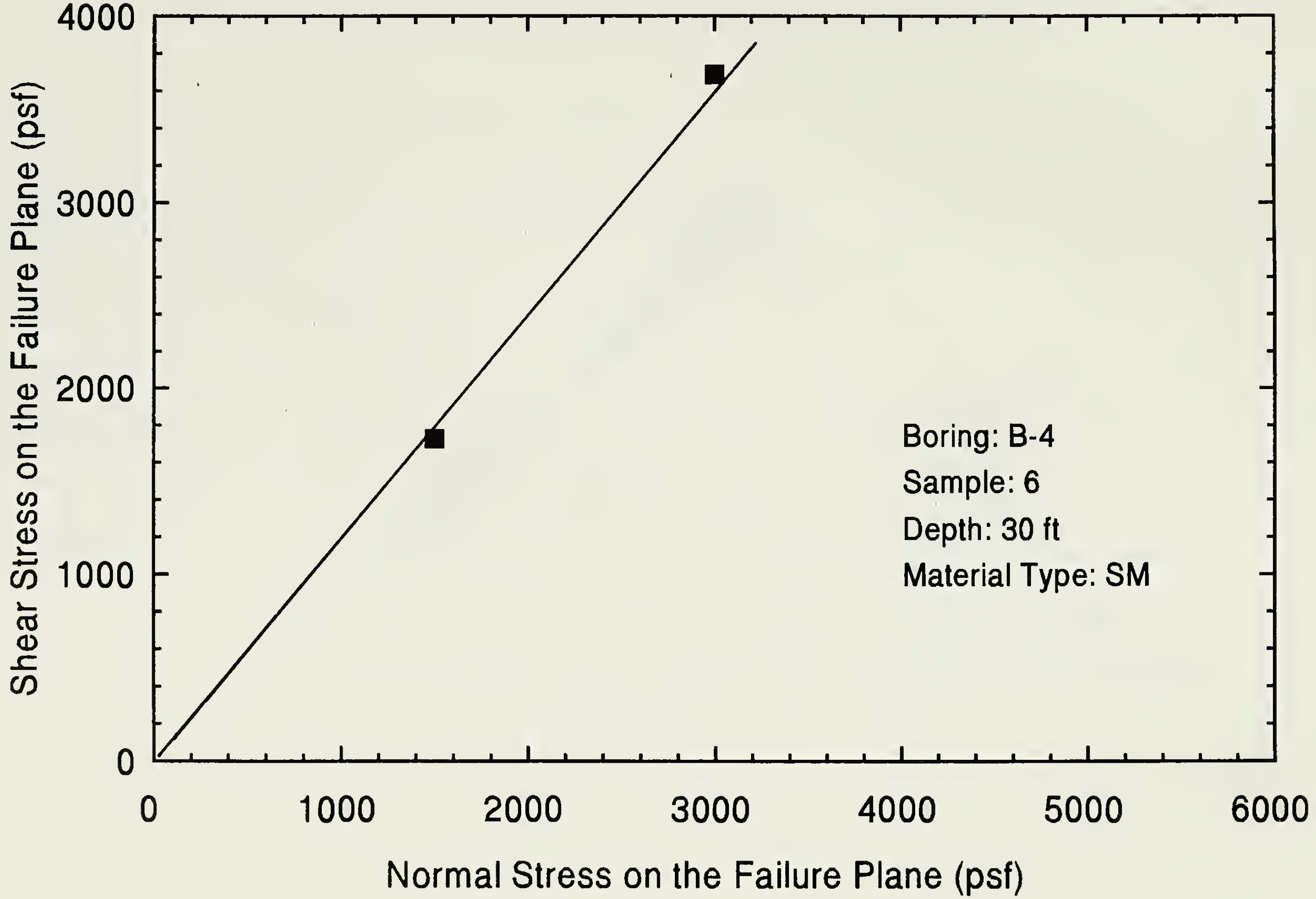

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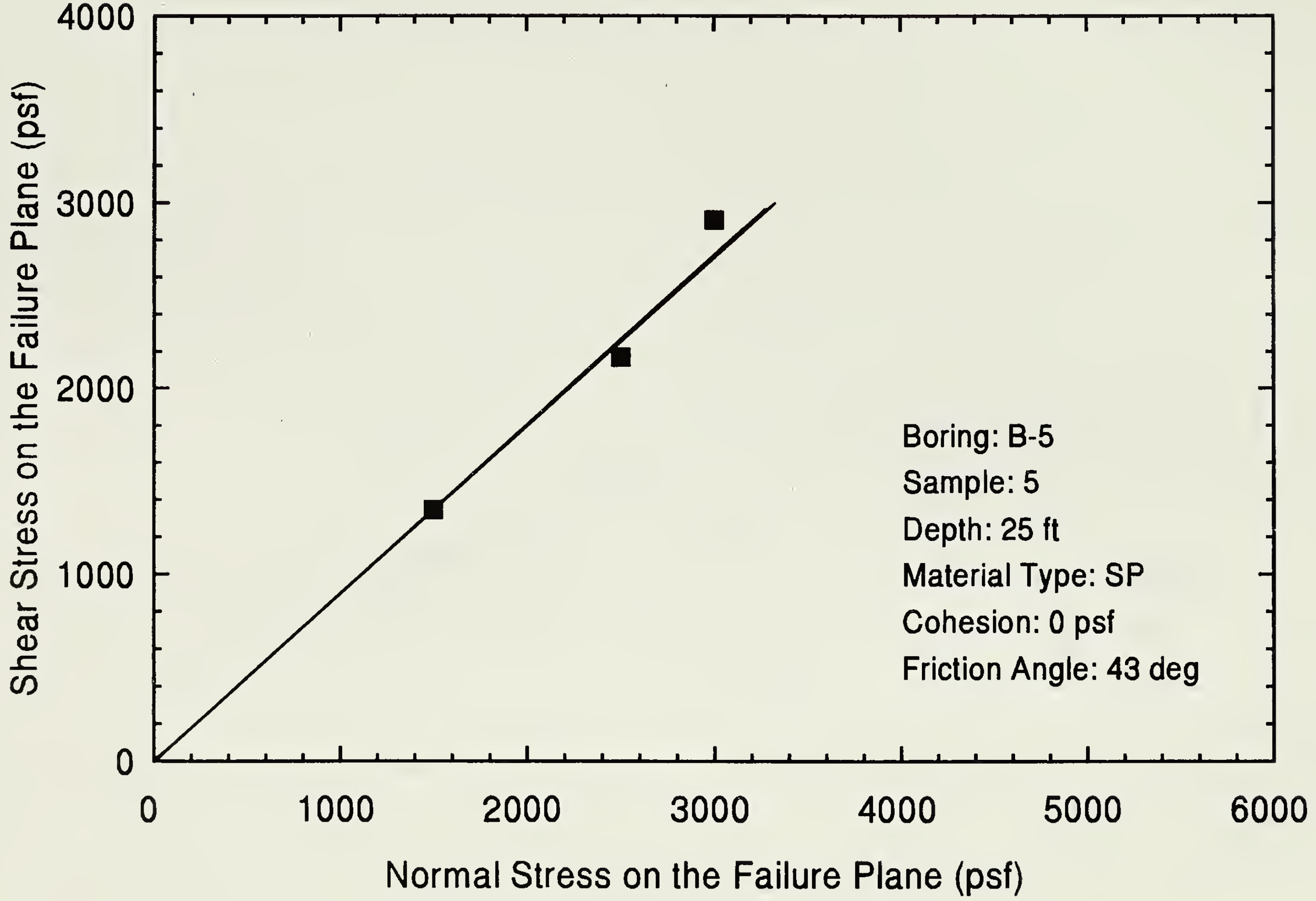

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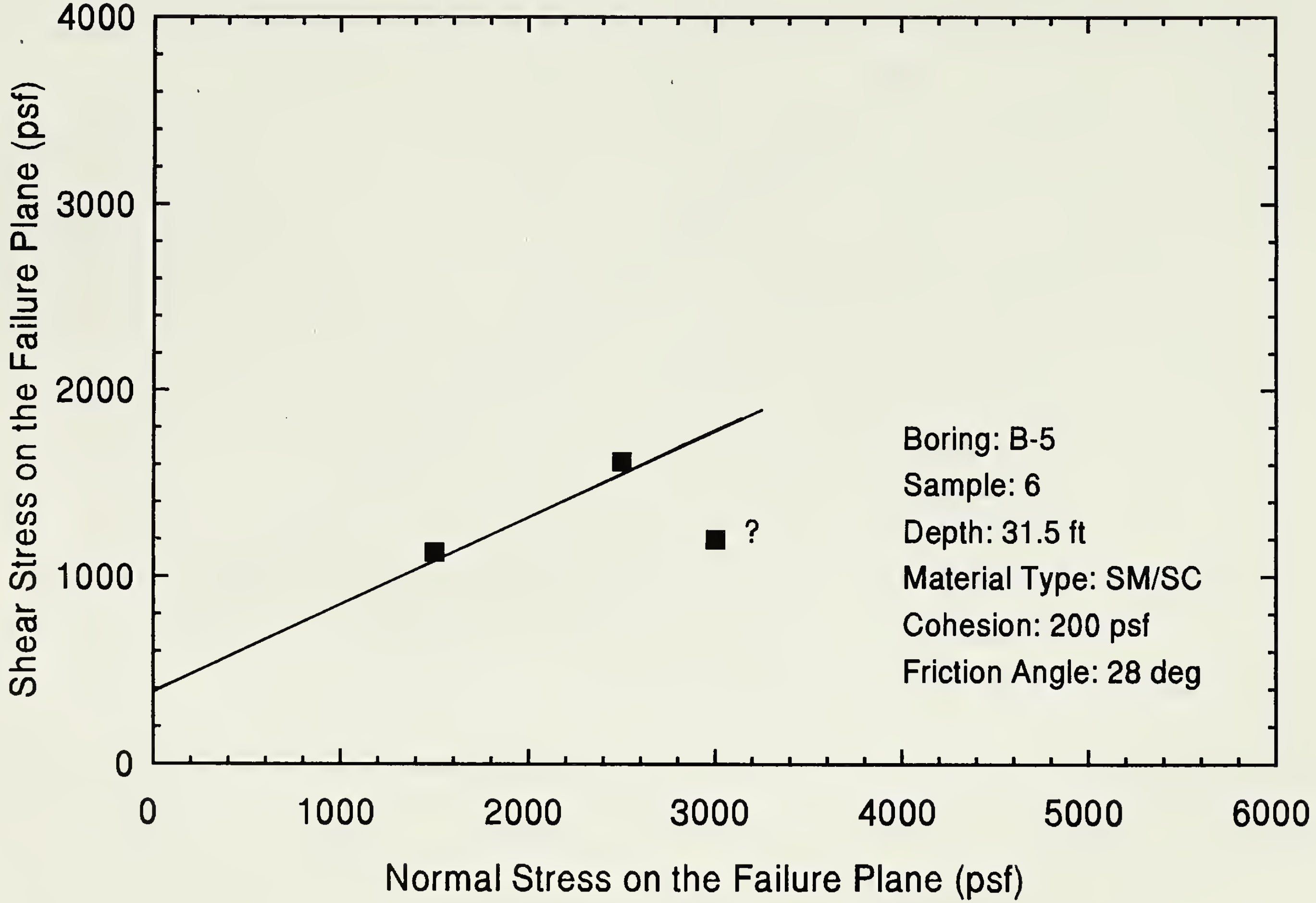

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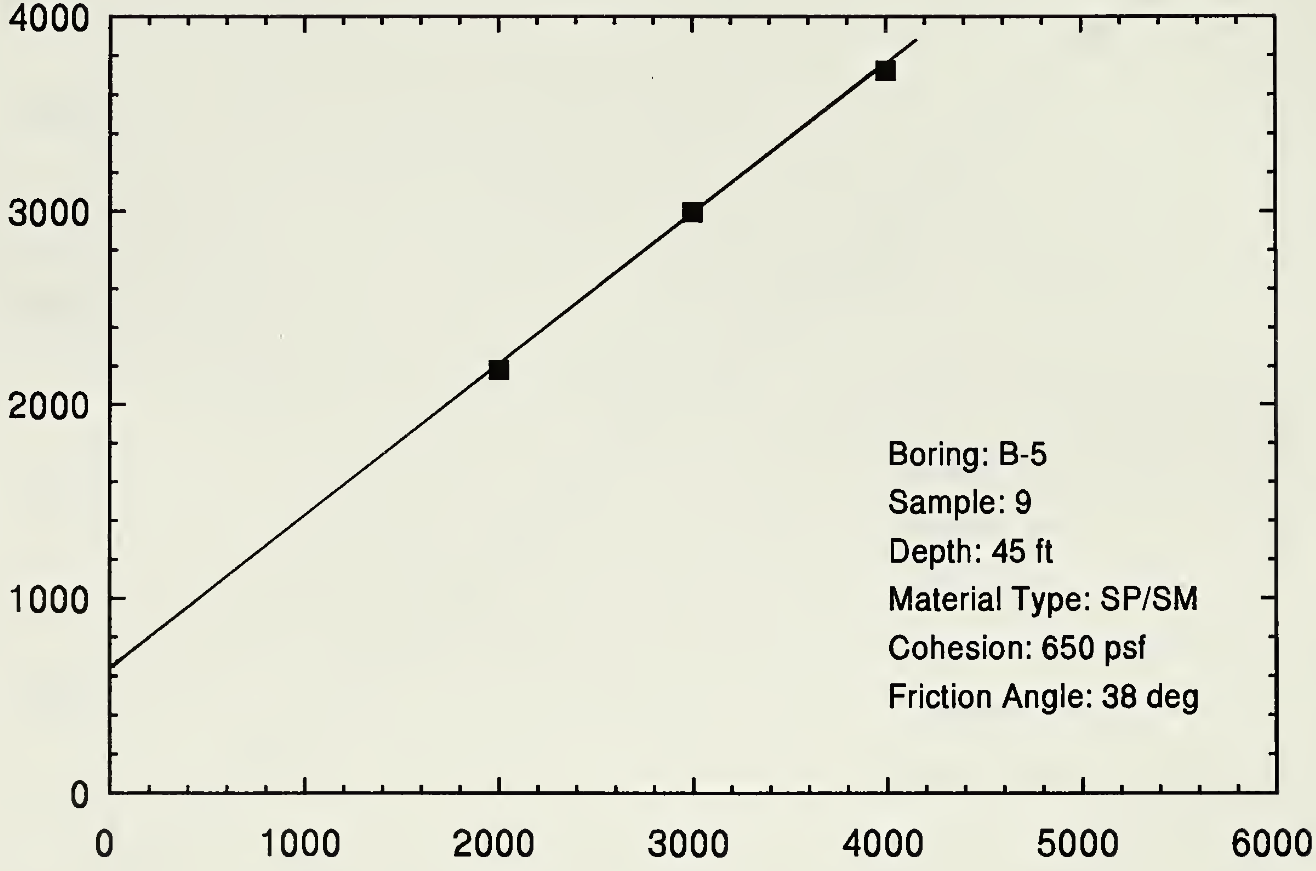

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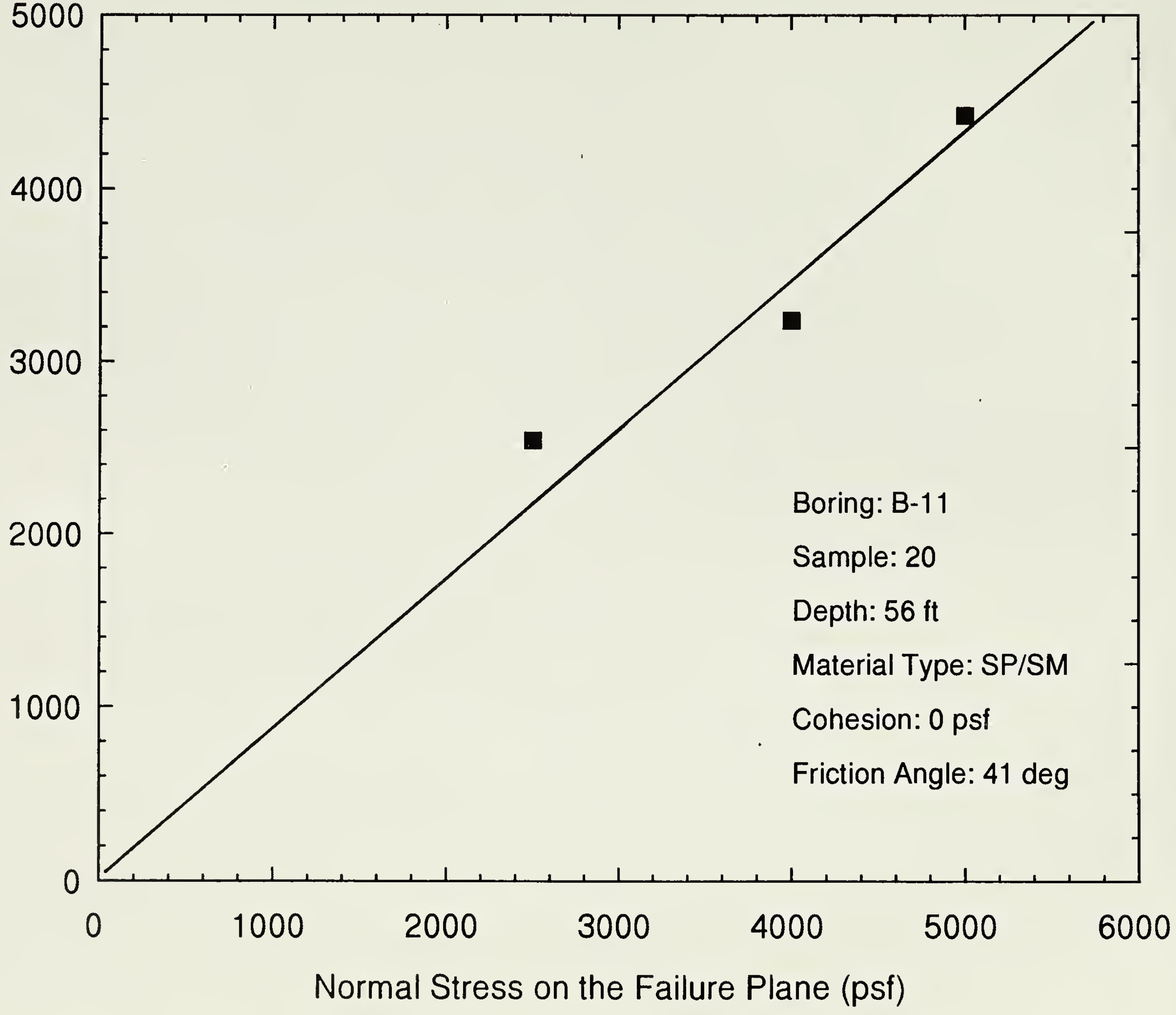


ATTERBERG LIMITS TESTS

The results of the Atterberg Limits analyses are presented in the following subsection. Atterberg Limits were determined for ten samples of cohesive soils and soft (weathered) rock. The results are summarized on Plate B-21.

SUMMARY OF ATTERBERG LIMIT TEST RESULTS

Boring Number	Sample Depth (ft)	Material Type	Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Liquidity Index	Comments
B-1	15	CH	47.0	108.9	46.4	21.0	25.4	1.02	Bay Mud
B-3	20.0	CL	18.8	129.8	28.4	15.5	12.9	0.26	Stiff Sandy Clay
B-5	100.0	CH	37.9	115.5	64.9	31.1	33.8	0.20	Old Bay Clay
B-5	108.0	CH	36.9	116.3	64.6	28.6	36.0	0.23	Old Bay Clay
B-7	27.5	CL	-	-	27.2	15.0	12.2	-	Weathered Shale
B-7	44.5	CL-ML	-	-	20.3	14.5	5.8	-	Weathered Shale
B-7	49.5	CL	-	-	22.3	14.0	8.3	-	Weathered Shale
B-9	46.0	CL	-	-	26.6	16.5	10.1	-	Weathered Shale
B-9	56.0	CL	-	-	33.2	16.7	16.5	-	Weathered Shale
B-9	61.0	CL	-	-	31.2	16.9	14.3	-	Weathered Shale

CONSOLIDATION TESTS

The results of the consolidation tests are presented in the following subsection. Consolidation tests-were performed on two samples of the Old Bay Clay. A summary of the results is presented on Plate B-22. Plots of logarithms of consolidation and coefficients of vertical consolidation are shown on Plates B-23 and B-24.

SUMMARY OF CONSOLIDATION TEST RESULTS

Boring Number	Sample Depth (ft)	Material Type	Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit (%)	Plastic Limit (%)	PI[(1)]	In-Situ Effective Vertical Stress (psf)	Maximum Past Pressure (psf)	OCR[(2)]	CR[(3)]	RR[(4)]	SR[(5)]
B-5	100.5	CH	34.2	117.5	64.9	31.1	33.8	7,010	20,000	2.9	21.8	1.2	5.7
B-5	107.0	CH	38.1	114.9	64.6	36.0	28.6	7,350	18,000	2.5	38.8	1.0	6.6

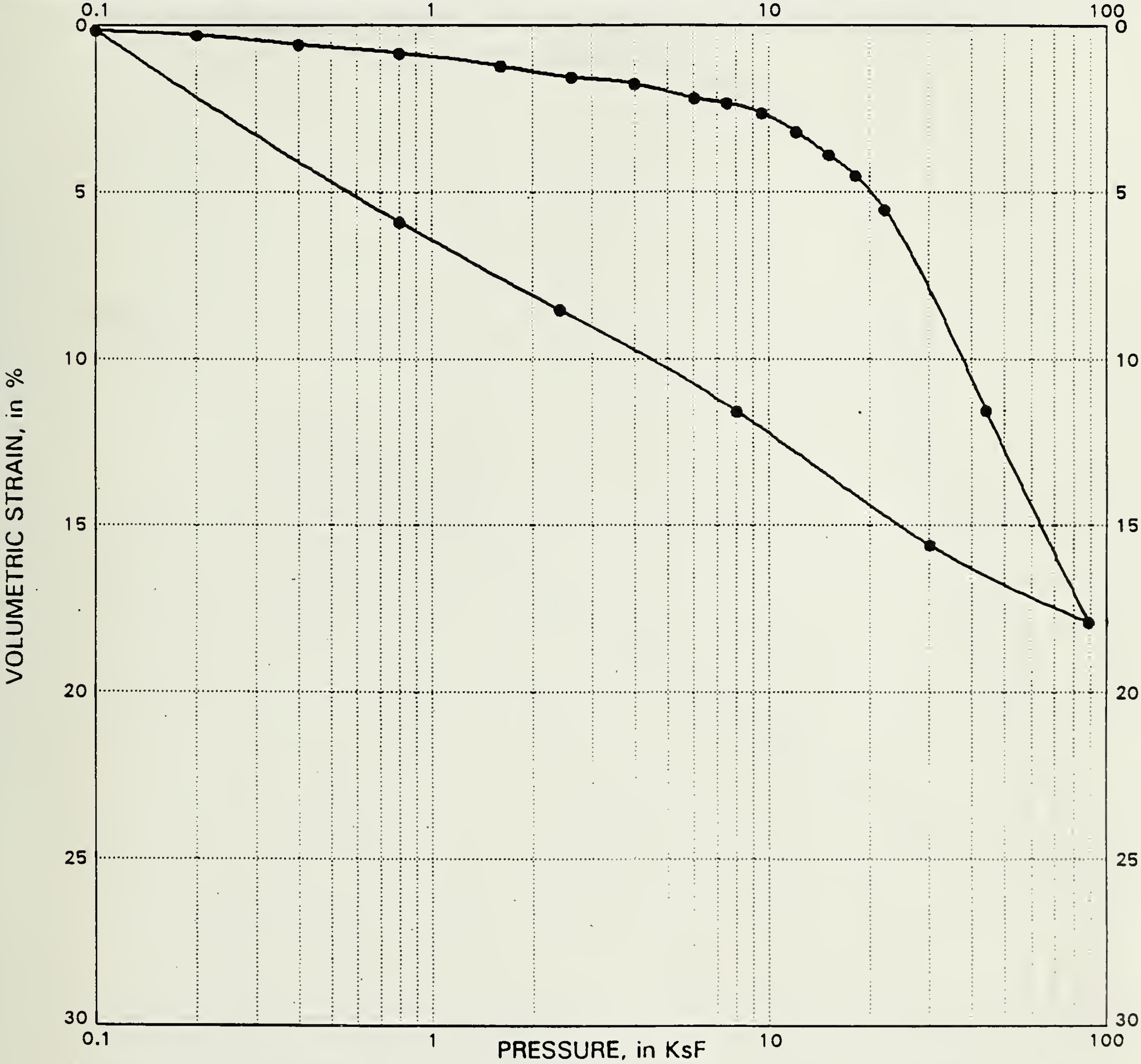
Notes:
(1) PI Plasticity Index
(2) OCR Over Consolidation Ratio
(3) CR Compression Ratio
(4) RR Recompression Ratio
(5) SR Swelling Ratio

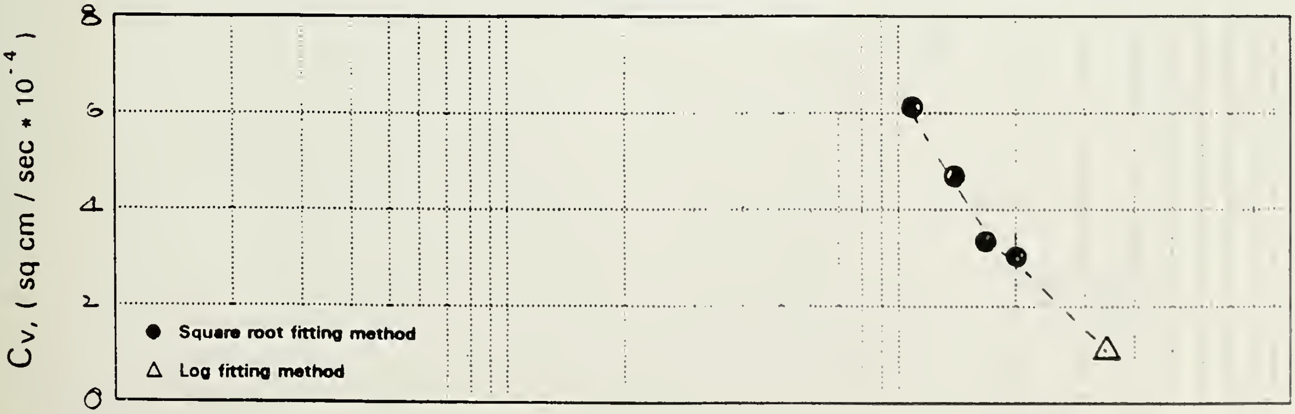
CONSOLIDATION TEST

Boring No: B-5 Sample No: Depth, ft: 100.5

Material: (CH) GRAY SILTY CLAY w/ OCCASIONAL COARSE SAND

	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height inches	Diameter inches	Specific Gravity	Liquid Limit, %	Plastic Limit, %
Initial	34.2	117.5	0.960	98	1.00	2.416	2.75 Assumed	64.9	31.1
Final	35.5	118.9	0.956	100	0.998				



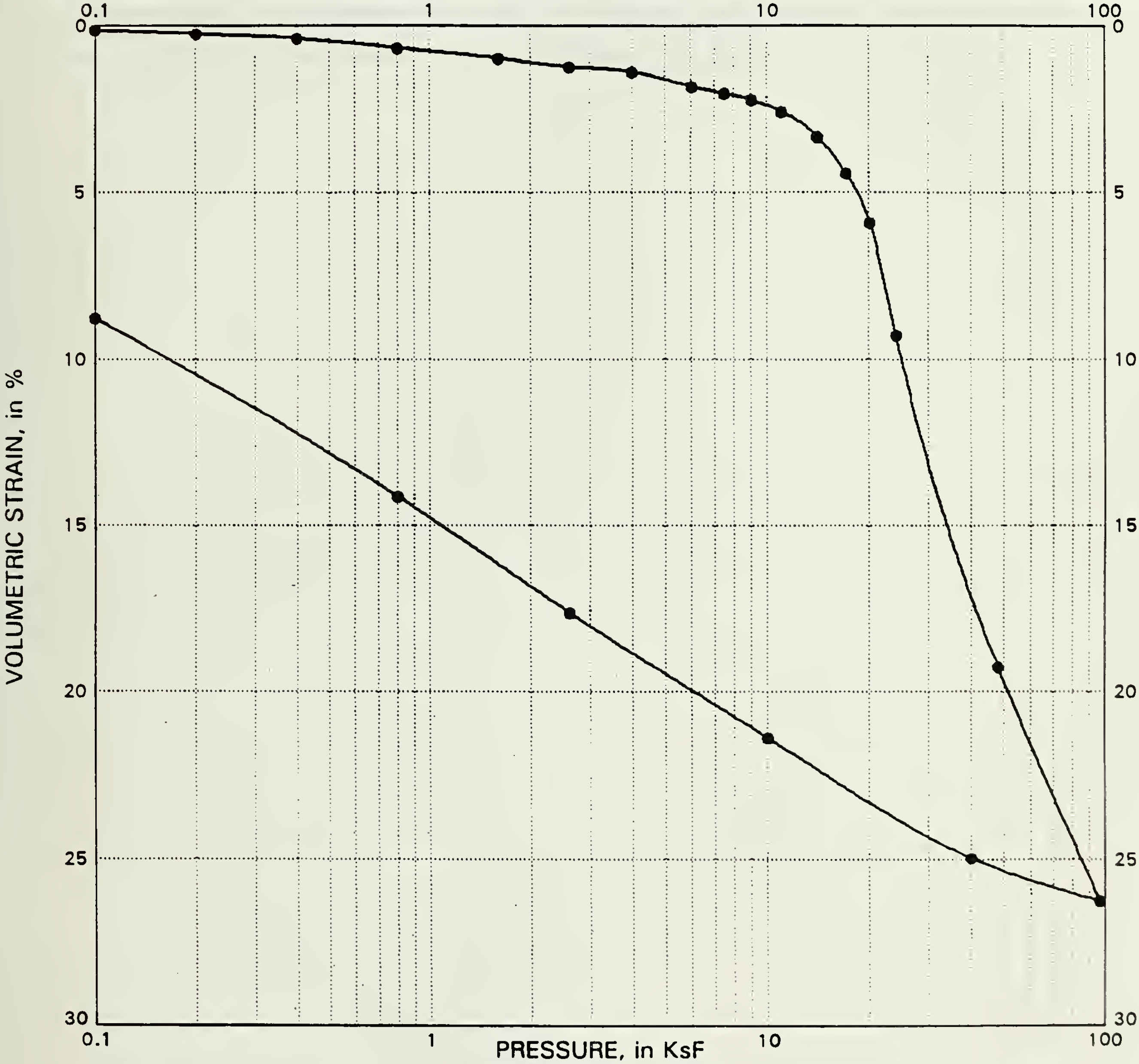


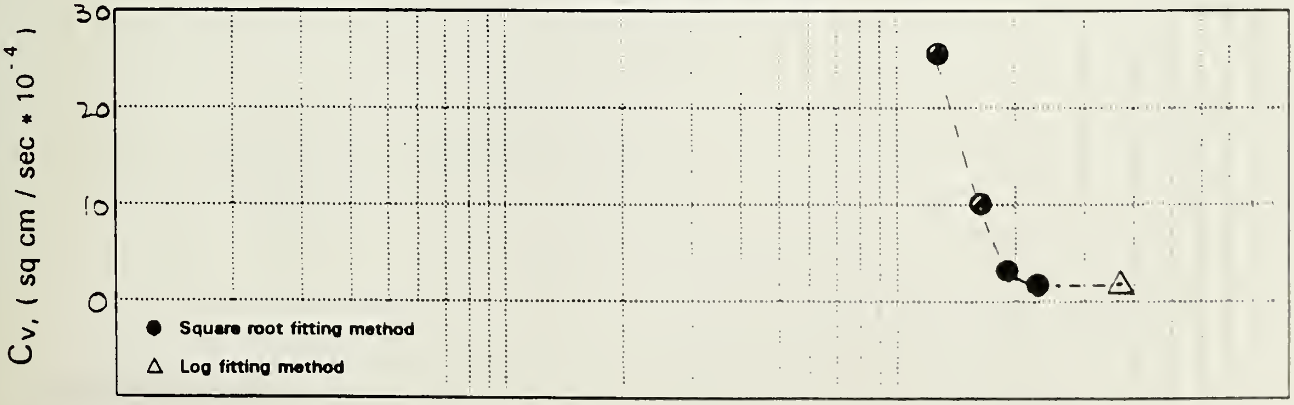
CONSOLIDATION TEST

Boring No: B-5 Sample No: Depth, ft: 107.0

Material: (CH) GRAY SILTY CLAY, OCCASIONAL SAND

	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height inches	Diameter inches	Specific Gravity	Liquid Limit, %	Plastic Limit, %
Initial	38.1	114.9	1.063	99	1.00	2.416	2.75 ASSUMED	64.6	28.6
Final	33.1	121.4	0.882	100	0.912				





UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS

The results of the unconsolidated undrained triaxial compression (UUTC) tests on soil samples are presented in the following subsection. UUTC tests were performed on five samples of cohesive soils. A summary of the results is presented on Plate B-25. Plots of stress versus strain for each test are presented on Plates B-26 through B-30.

SUMMARY OF UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (UUTC) TEST RESULTS
SOIL SAMPLES

Boring Number	Sample No.	Sample Depth (ft)	Material Type	Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Confining Pressure (psf)	Shear Strength (psf)
B-1	3	15	CH	47.0	108.9	46.4	21.0	25.4	1650	452
B-4	10	50	CL	14.2	138.4	-	-	-	5750	4495
B-5	20	101	CH	39.7	115.5	64.9	31.1	33.8	11000	2607
B-5	22	107.5	CH	36.9	116.3	64.6	28.6	36.0	12500	3717
B-11	8	26.0	CH	48.0	108.1	-	-	-	1950	757

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-1
SAMPLE #: 3
DEPTH (ft): 15
DATE TESTED: 07-11-95
SOIL: (CH) BAY MUD W/ SHELL FRAG. & SAND POCKETS

SPECIMEN MEASUREMENTS:-

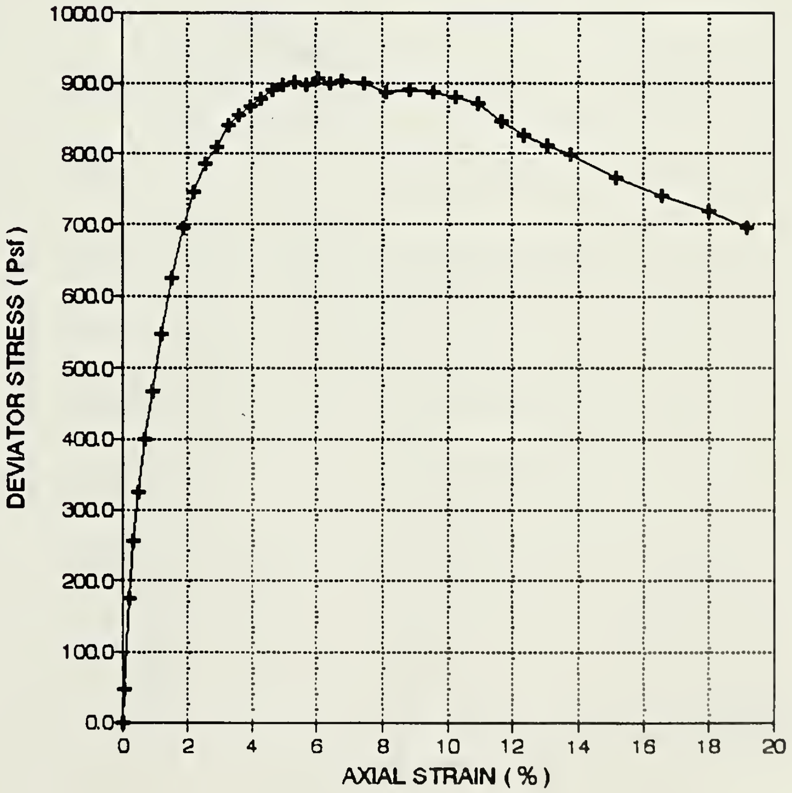
WT. OF WET SOIL + DISH = 509.6 (gms)
WT. OF DRY SOIL + DISH = 371.6 (gms)
WT. OF DISH = 78.0 (gms)
TOTAL WT. = 802.1 (gms)
HEIGHT = 6.120 (in.)
DIA: (TOP) = (in.)
(MID) = 2.416 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 4.584 (sq.in.)
VOLUME = 459.8 (c.c.)

WET DENSITY = 108.9 (Pcf)
DRY DENSITY = 74.1 (Pcf)
MOIST. CONTENT = 47.0 (%)

RATE OF SHEARING = 0.7 %/min
LOAD CELL = 500.0 lbs.
CONFINING PRES. = 1650 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.04	46.7
0.19	174.8
0.36	256.0
0.52	325.3
0.72	398.1
0.92	466.7
1.19	546.2
1.54	624.8
1.88	695.2
2.23	746.0
2.57	785.1
2.92	808.8
3.27	839.7
3.62	855.5
3.96	867.4
4.30	879.2
4.65	890.9
5.01	898.6
5.36	902.6
5.71	899.3
6.06	906.9
6.41	899.9
6.76	903.8
7.46	900.6
8.16	886.7
8.85	890.7
9.56	887.3
10.25	880.4
10.95	870.1
11.66	846.0
12.35	825.8
13.05	812.3
13.77	798.9
15.18	766.1
16.58	740.4
18.01	718.2
19.18	695.3



Dames & Moore, Inc.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-4
SAMPLE #: 10
DEPTH (ft): 50
DATE TESTED: 07-12-95
SOIL:

SPECIMEN MEASUREMENTS:-

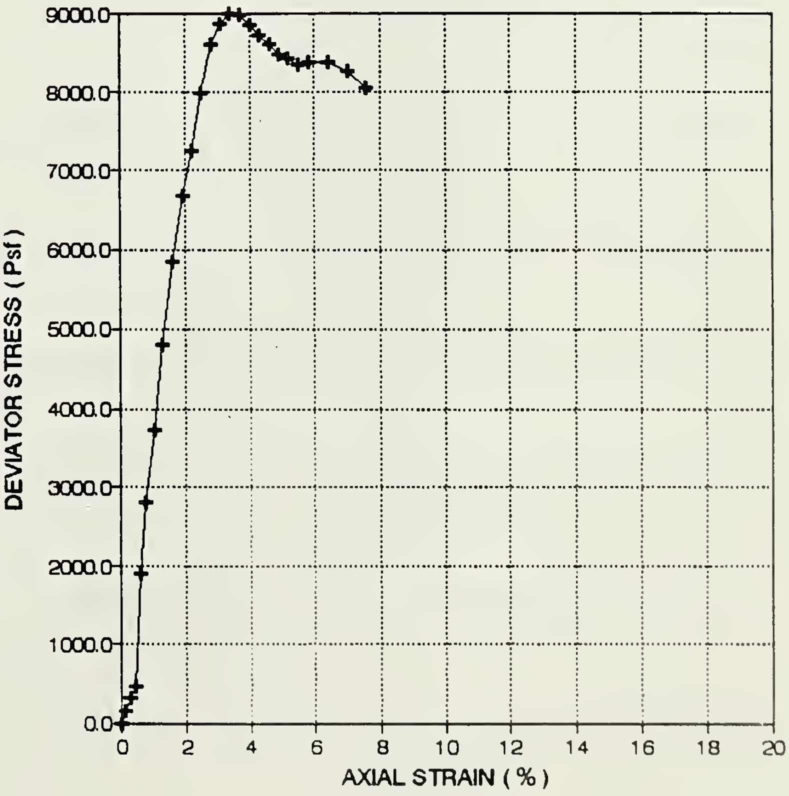
WT. OF WET SOIL + DISH = 1688.5 (gms)
WT. OF DRY SOIL + DISH = 1493.0 (gms)
WT. OF DISH = 119.5 (gms)
TOTAL WT. = 1569.6 (gms)
HEIGHT = 6.650 (in.)
DIA: (TOP) = (in.)
(MID) = 2.875 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.492 (sq.in.)
VOLUME = 707.4 (c.c.)

WET DENSITY = 138.4 (Pcf)
DRY DENSITY = 121.2 (Pcf)
MOIST. CONTENT = 14.2 (%)

RATE OF SHEARING = 0.4 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES. = 5750 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.15	156.3
0.30	322.5
0.45	457.0
0.62	1907.9
0.79	2825.8
1.03	3727.8
1.32	4808.0
1.62	5840.6
1.91	6672.8
2.21	7244.1
2.50	7985.1
2.80	8599.8
3.10	8876.6
3.40	8990.6
3.70	8982.7
4.00	8854.6
4.30	8717.0
4.60	8600.1
4.90	8483.7
5.20	8417.4
5.50	8351.3
5.80	8373.9
6.40	8369.3
7.00	8247.7
7.60	8039.8



UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-5
SAMPLE #: -
DEPTH (ft): 101
DATE TESTED: 06-07-95
SOIL: (CH) OLD ABY MUD w/ occ. fine gravel

SPECIMEN MEASUREMENTS:-

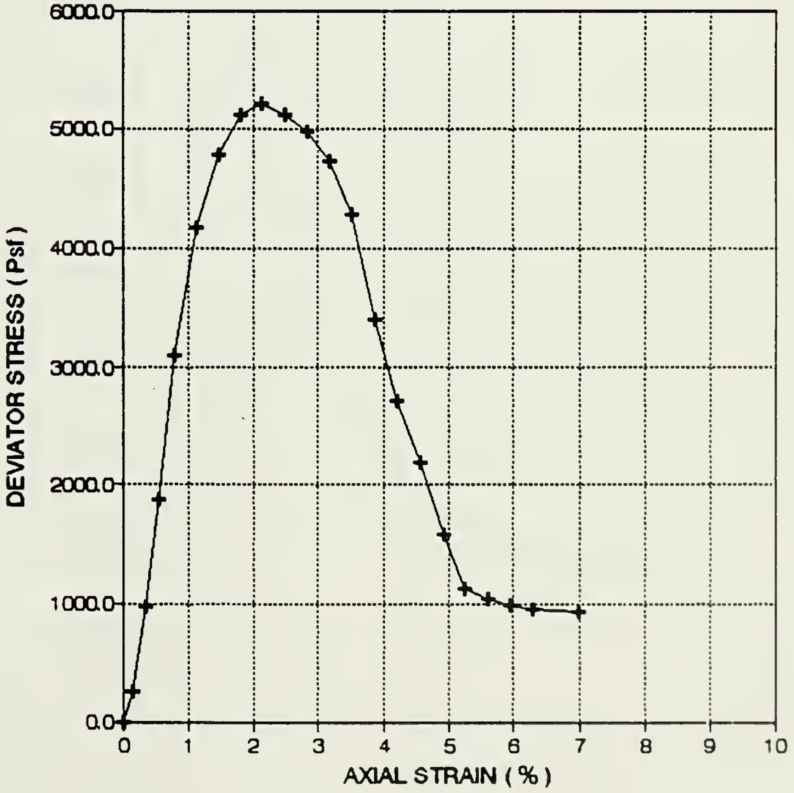
WT. OF WET SOIL + DISH = 1337.5 (gms)
WT. OF DRY SOIL + DISH = 1000.1 (gms)
WT. OF DISH = 109.2 (gms)
TOTAL WT. = 1229.1 (gms)
HEIGHT = 6.220 (in.)
DIA: (TOP) = (in.)
(MID) = 2.880 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.514 (sq.in.)
VOLUME = 664.0 (c.c.)

WET DENSITY = 115.5 (Pcf)
DRY DENSITY = 83.8 (Pcf)
MOIST. CONTENT = 37.9 (%)

RATE OF SHEARING = 0.7 %/min
LOAD CELL = 500.0 lbs.
CONFINING PRES. = 11000 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.15	259.9
0.35	982.8
0.54	1885.5
0.80	3098.2
1.13	4171.3
1.47	4778.0
1.81	5111.2
2.14	5214.4
2.49	5126.6
2.83	4970.3
3.17	4724.5
3.51	4277.0
3.86	3392.4
4.21	2716.1
4.56	2191.1
4.91	1576.1
5.26	1126.5
5.61	1039.6
5.95	984.3
6.29	949.9
6.99	932.6



Dames & Moore, Inc.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-5
SAMPLE #: -
DEPTH (ft): 107.5
DATE TESTED: 06-07-95 B
SOIL: (CH) OLD ABY MUD w/ occ. fine gravel & shell frag.

SPECIMEN MEASUREMENTS:-

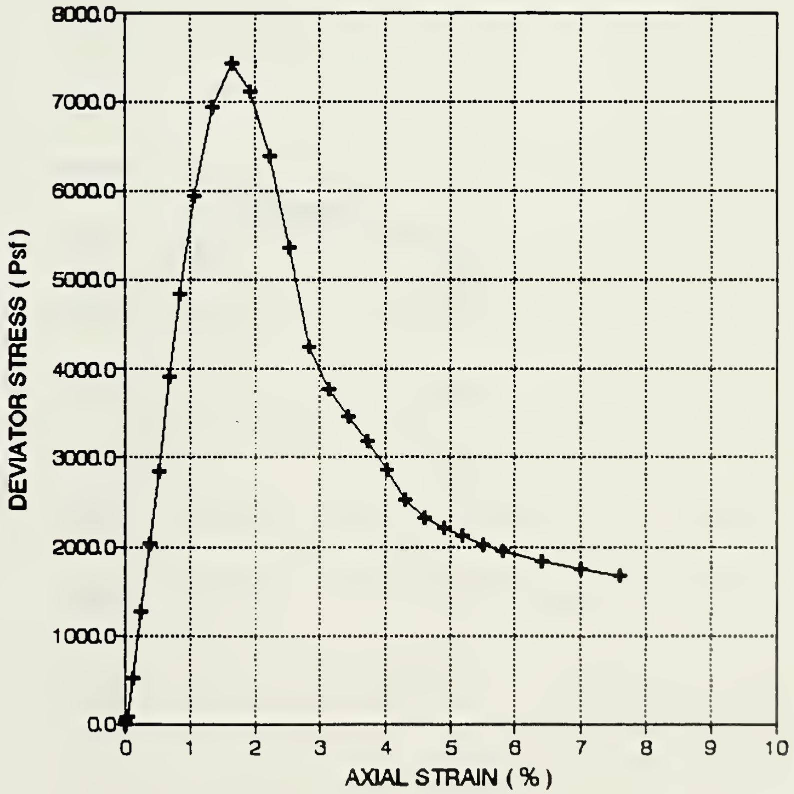
WT. OF WET SOIL + DISH = 1318.7 (gms)
WT. OF DRY SOIL + DISH = 985.6 (gms)
WT. OF DISH = 82.5 (gms)
TOTAL WT. = 1237.3 (gms)
HEIGHT = 6.230 (in.)
DIA: (TOP) = (in.)
(MID) = 2.878 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.505 (sq.in.)
VOLUME = 664.1 (c.c.)

WET DENSITY = 116.3 (Pcf)
DRY DENSITY = 84.9 (Pcf)
MOIST. CONTENT = 36.9 (%)

RATE OF SHEARING = 0.6 %/min
LOAD CELL = 500.0 lbs.
CONFINING PRES. = 12500 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.00	38.4
0.02	71.3
0.05	90.5
0.13	512.4
0.26	1264.2
0.39	2044.1
0.52	2849.3
0.68	3907.2
0.85	4841.9
1.07	5938.6
1.35	6942.0
1.64	7434.5
1.93	7116.5
2.22	6389.5
2.53	5359.0
2.83	4251.8
3.13	3765.8
3.42	3457.5
3.72	3180.2
4.01	2865.1
4.31	2533.3
4.61	2318.6
4.90	2212.4
5.20	2114.4
5.50	2027.3
5.80	1940.8
6.40	1838.5
7.01	1750.1
7.60	1680.6



Dames & Moore, Inc.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-11
SAMPLE #: 8
DEPTH (ft): 26
DATE TESTED: 9-5-95
SOIL: (CH) BAY MUD W/ TR. SHELL FRAG. & SMALL SAND LENSES

SPECIMEN MEASUREMENTS:-

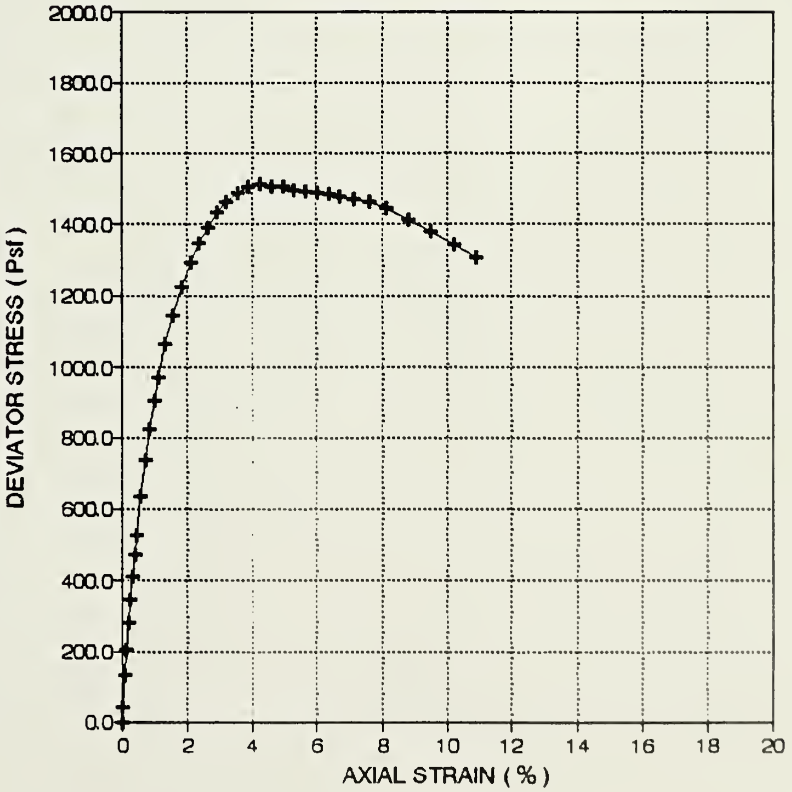
WT. OF WET SOIL + DISH = 850.1 (gms)
WT. OF DRY SOIL + DISH = 612.6 (gms)
WT. OF DISH = 117.7 (gms)
TOTAL WT. = 735.9 (gms)
HEIGHT = 5.670 (in.)
DIA: (TOP) = (in.)
(MID) = 2.413 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 4.573 (sq.in.)
VOLUME = 424.9 (c.c.)

WET DENSITY = 108.1 (Pcf)
DRY DENSITY = 73.0 (Pcf)
MOIST. CONTENT = 48.0 (%)

RATE OF SHEARING = 0.7 %/min
LOAD CELL = 500.0 lbs.
CONFINING PRES.= 1950 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.02	42.9
0.08	132.6
0.15	206.5
0.21	280.4
0.27	346.4
0.34	412.3
0.40	474.2
0.46	528.3
0.60	636.2
0.73	736.1
0.87	824.1
1.00	904.1
1.14	972.3
1.35	1066.5
1.56	1144.9
1.83	1222.1
2.11	1291.2
2.39	1344.8
2.66	1390.3
2.94	1431.8
3.22	1461.7
3.57	1486.5
3.92	1507.4
4.27	1513.1
4.61	1507.7
4.96	1505.9
5.30	1496.8
5.66	1494.8
6.01	1489.2
6.37	1483.5
6.72	1478.0
7.14	1471.4
7.63	1463.6
8.12	1445.1
8.82	1412.7
9.51	1380.9
10.21	1342.1
10.92	1307.2



LABORATORY TESTS ON ROCK SAMPLES

The results of unconfined compression tests, point load tests and unconsolidated undrained triaxial compression tests (UUTC) on rock samples are presented in the following subsection. Summaries of each of the test results are presented on Plates B-31 through B-33. Plots of deviator stress versus strain for each UUTC test are presented on Plates B-34 through B-41.

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH ON ROCK SAMPLES

Rock Type	Boring Number	Depth (feet)	Total Unit Weight (pcf)	Compressive Strength (psi)
Sandstone	B-1	80.0	167.1	11500
	B-2	21.8	159.8	2350
	B-2	30.0	161.3	7360
	B-2	43.2	168.1	27180
	B-7	15.1	157.9	4310
	B-7	18.3	160.3	1360
	B-7	37.4	165.4	8063
	B-7	53.2	166.8	5950
	B-8	95.0	159.7	1020
	B-9	10.8	162.5	2280
	B-9	28.1	165.9	12410
	B-9	37.0	166.3	14170
Shale	B-2	50.4	168.6	5790
	B-9	41.3	145.7	250
	B-9	54.3	149.6	210
	B-9	56.8	151.2	180

SUMMARY OF POINT LOAD TESTS ON ROCK SAMPLES

Rock Type	Boring Number	Depth (feet)	Point Load Strength, I_s (psi)	Comments
Sandstone	B-1	80.0	229.7	
	B-2	21.8	70.4	
	B-2	30.0	483.9	Possible dissolution of quartz fracture filling
	B-2	43.2	508.5	
	B-4	91.2	115.8	
	B-7	5.6	115.4	
	B-7	15.1	133.0	
	B-7	18.3	82.8	
	B-7	21.4	93.7	
	B-7	37.4	513.1	
	B-7	45.6	638.0	
	B-7	51.4	475.4	
	B-7	53.2	247.8	
	B-8	52.2	16.3	crushed zone 52' to 52.4'
	B-8	65.8	61.2	
	B-8	86.2	750.6	
	B-8	88.0	420.4	
	B-8	95.0	22.2	
	B-9	10.8	154.7	
	B-9	15.2	253.2	
	B-9	28.1	556.3	
	B-9	37.0	378.7	
Shale	B-4	126.8	33.8	Shale interbedded with siltstone
	B-4	131.4	46.0	Siltstone
	B-9	33.9	212.9	
	B-9	54.3	6.2	Highly sheared and foliated
	B-9	56.8	11.0	Small blocks in sheared matrix

SUMMARY OF UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (UUTC)
TEST RESULTS
ROCK SAMPLES

Boring Number	Sample No.	Sample Depth (ft)	Material Type	Moisture Content (%)	Total Unit Weight (pcf)	Confining Pressure (psf)	Shear Strength (psf)
B-3	8	60	Soft Rock	6.4	147.2	7200	4641
B-3	10	65	Soft Rock	5.8	151.3	7850	3785
B-3	12	69.3	Soft Rock	7.6	149.4	8400	1429
B-3	14	74.3	Soft Rock	7.5	148.2	9000	2250
B-8	6	26.5	Soft Rock	9.0	138.0	3000	2178
B-8	7	29	Soft Rock	8.7	140.1	3500	4132
B-8	10	36.5	Soft Rock	10.6	136.8	4450	4035
B-8	11	39	Soft Rock	8.9	139.2	4800	3603

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-3
SAMPLE #: 8
DEPTH (ft): 60
DATE TESTED: 07-12-95
SOIL: SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

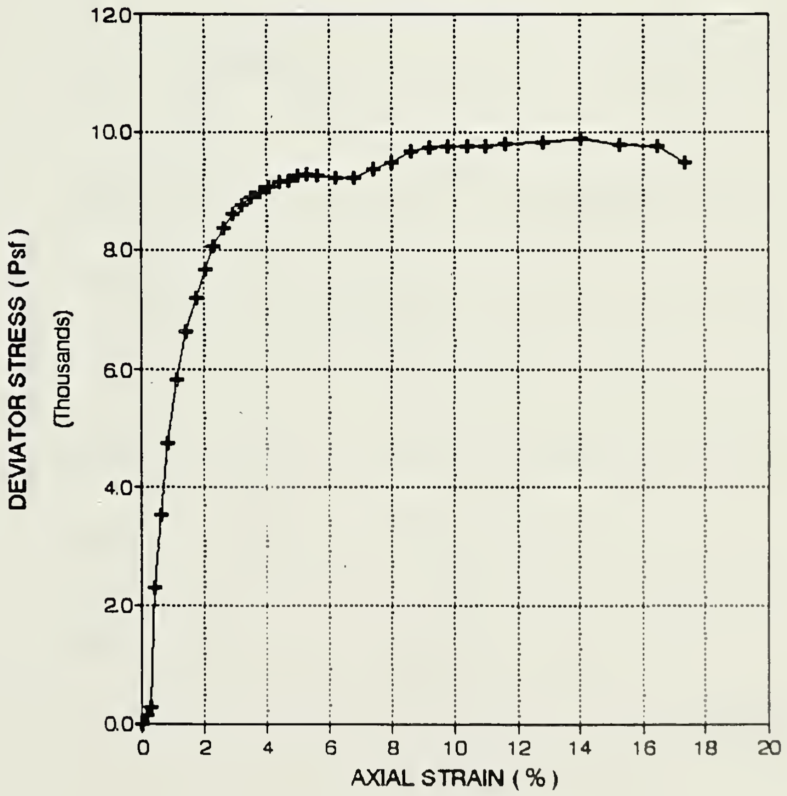
WT. OF WET SOIL + DISH = 1777.3 (gms)
WT. OF DRY SOIL + DISH = 1680.7 (gms)
WT. OF DISH = 167.5 (gms)
TOTAL WT. = 1610.5 (gms)
HEIGHT = 6.410 (in.)
DIA: (TOP) = (in.)
(MID) = 2.877 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.501 (sq.in.)
VOLUME = 682.9 (c.c.)

WET DENSITY = 147.2 (Pcf)
DRY DENSITY = 138.3 (Pcf)
MOIST. CONTENT = 6.4 (%)

RATE OF SHEARING = 0.6 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES.= 7200 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.14	145.7
0.29	280.5
0.45	2292.2
0.62	3541.1
0.85	4741.6
1.14	5829.7
1.44	6623.7
1.73	7197.9
2.03	7676.3
2.32	8060.0
2.62	8350.0
2.91	8608.1
3.21	8753.2
3.51	8877.1
3.81	8980.0
4.11	9061.7
4.41	9132.7
4.71	9153.5
5.02	9253.1
5.31	9283.3
5.62	9263.5
6.22	9224.2
6.82	9213.8
7.41	9357.5
8.01	9488.6
8.61	9664.8
9.21	9733.8
9.81	9763.5
10.41	9763.9
11.01	9772.2
11.61	9807.6
12.83	9827.4
14.04	9878.7
15.26	9782.8
16.46	9765.7
17.35	9472.4



Dames & Moore, Inc.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT:	ICF KAISER
JOB #:	30751-001-003
PROJECT:	CALTRAIN EXTENSION
BORING #:	B-3
SAMPLE #:	10
DEPTH (ft):	65
DATE TESTED:	07-12-95
SOIL:	SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

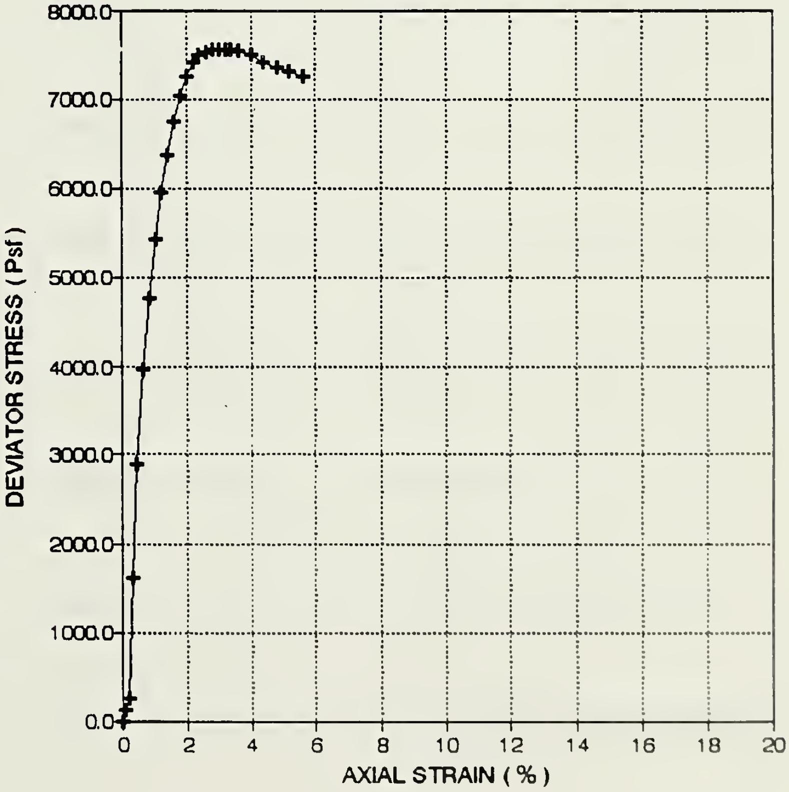
WT. OF WET SOIL + DISH = 1670.2 (gms)
WT. OF DRY SOIL + DISH = 1583.3 (gms)
WT. OF DISH = 82.4 (gms)
TOTAL WT. = 1614.7 (gms)
HEIGHT = 6.270 (in.)
DIA: (TOP) = (in.)
(MID) = 2.873 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.483 (sq.in.)
VOLUME = 666.1 (c.c.)

WET DENSITY = 151.3 (Pcf)
DRY DENSITY = 143.0 (Pcf)
MOIST. CONTENT = 5.8 (%)

RATE OF SHEARING = 0.4 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES.= 7850 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.09	125.3
0.20	260.7
0.31	1614.4
0.46	2901.7
0.65	3965.4
0.84	4765.9
1.03	5418.6
1.22	5954.9
1.42	6375.7
1.62	6743.2
1.81	7037.9
2.01	7258.7
2.21	7418.0
2.40	7494.6
2.60	7540.4
2.80	7565.9
3.00	7570.3
3.20	7565.2
3.40	7559.7
3.60	7554.1
3.99	7503.1
4.40	7421.6
4.80	7360.4
5.20	7309.7
5.60	7258.9



UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-3
SAMPLE #: 12
DEPTH (ft): 69.3
DATE TESTED: 07-12-95
SOIL: SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

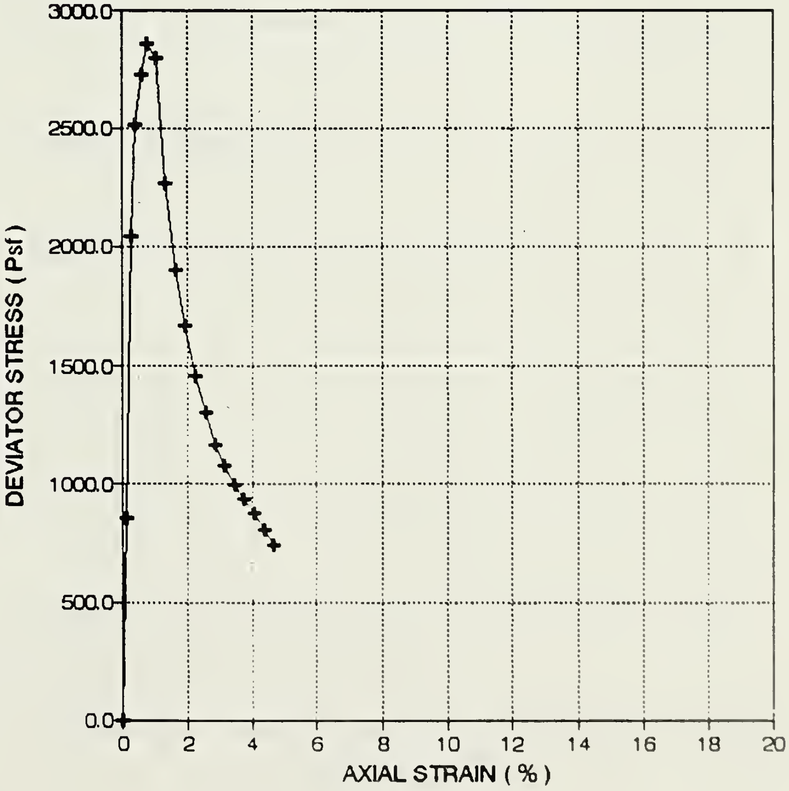
WT. OF WET SOIL + DISH = 1710.6 (gms)
WT. OF DRY SOIL + DISH = 1595.0 (gms)
WT. OF DISH = 80.9 (gms)
TOTAL WT. = 1630.4 (gms)
HEIGHT = 6.400 (in.)
DIA: (TOP) = (in.)
(MID) = 2.875 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.492 (sq.in.)
VOLUME = 680.8 (c.c.)

WET DENSITY = 149.4 (Pcf)
DRY DENSITY = 138.8 (Pcf)
MOIST. CONTENT = 7.6 (%)

RATE OF SHEARING = 0.6 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES.= 8400 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.15	854.3
0.29	2039.1
0.44	2513.9
0.61	2727.1
0.79	2856.9
1.03	2798.3
1.34	2264.7
1.64	1898.6
1.94	1667.6
2.24	1458.5
2.55	1301.5
2.85	1165.7
3.15	1081.2
3.45	997.3
3.74	934.0
4.05	881.0
4.35	808.3
4.66	746.1



UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

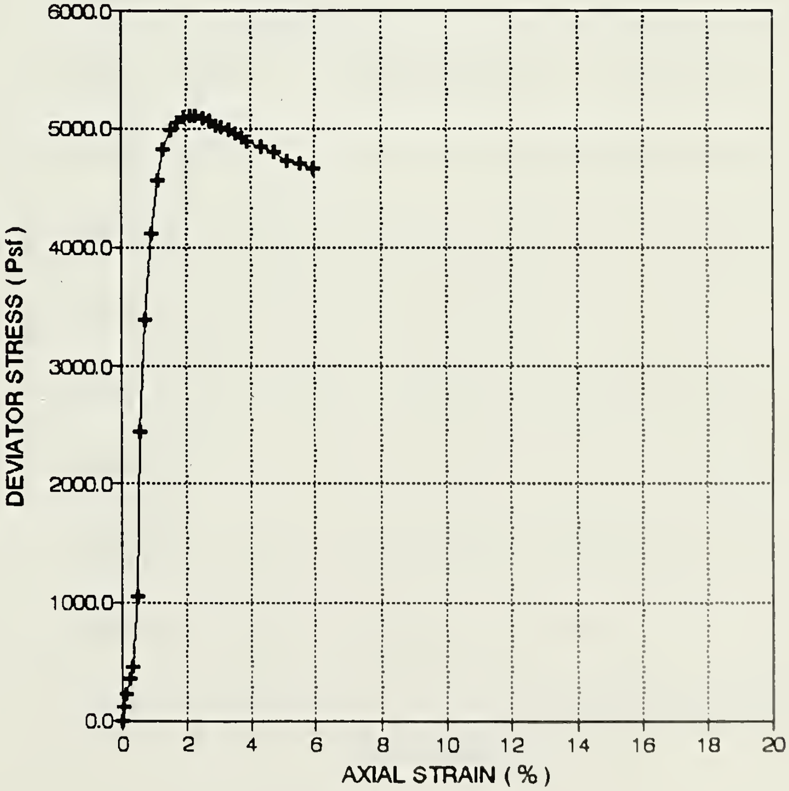
CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-3
SAMPLE #: 14
DEPTH (ft): 74.3
DATE TESTED: 07-12-95 -
SOIL: SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

WT. OF WET SOIL + DISH	=	1740.2	(gms)
WT. OF DRY SOIL + DISH	=	1626.7	(gms)
WT. OF DISH	=	117.6	(gms)
TOTAL WT.	=	1623.7	(gms)
HEIGHT	=	6.380	(in.)
DIA: (TOP)	=		(in.)
(MID)	=	2.885	(in.)
(BOT)	=		(in.)
(AVERAGE)	=		(in.)
AREA	=	6.537	(sq.in.)
VOLUME	=	683.4	(c.c.)
WET DENSITY	=	148.2	(Pcf)
DRY DENSITY	=	137.9	(Pcf)
MOIST. CONTENT	=	7.5	(%)
RATE OF SHEARING	=	0.4	%/min
LOAD CELL	=	2000.0	lbs.
CONFINING PRES.	=	9000	psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.06	113.9
0.16	227.6
0.26	351.4
0.35	444.0
0.47	1051.9
0.58	2441.3
0.74	3383.7
0.93	4116.1
1.13	4558.7
1.33	4825.7
1.53	4979.1
1.72	5050.6
1.92	5091.1
2.13	5101.0
2.32	5100.9
2.52	5080.3
2.72	5059.7
2.92	5019.1
3.12	5009.0
3.32	4978.6
3.52	4948.2
3.72	4918.0
3.92	4887.8
4.33	4837.6
4.73	4797.6
5.13	4728.2
5.53	4698.4
5.93	4659.1



Dames & Moore, Inc.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-8
SAMPLE #: 6
DEPTH (ft): 26.5
DATE TESTED: 07-14-95
SOIL: SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

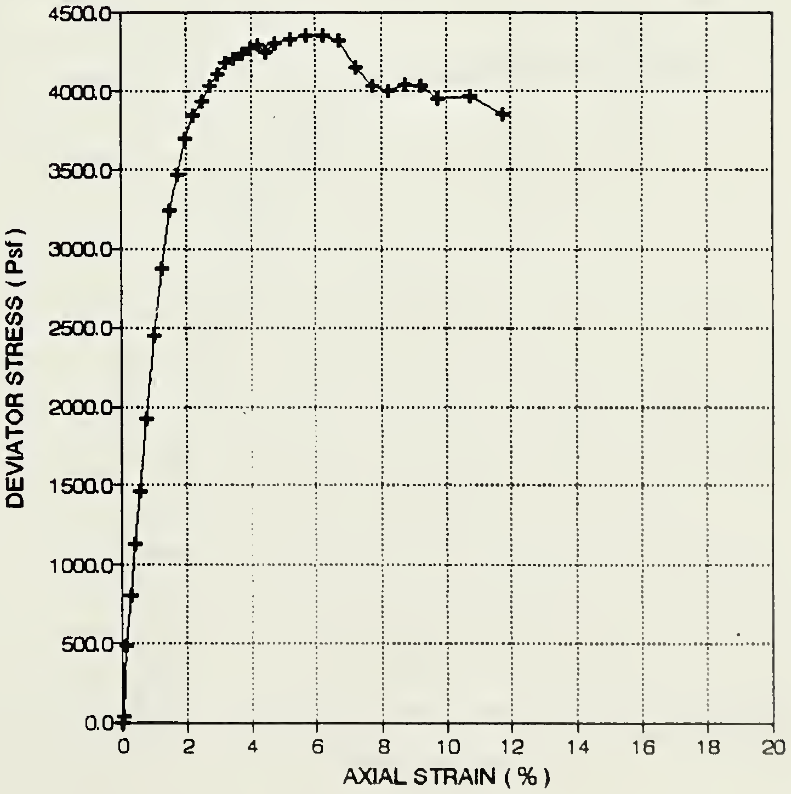
WT. OF WET SOIL + DISH = 1570.8 (gms)
WT. OF DRY SOIL + DISH = 1454.4 (gms)
WT. OF DISH = 164.2 (gms)
TOTAL WT. = 1542.5 (gms)
HEIGHT = 6.480 (in.)
DIA: (TOP) = (in.)
(MID) = 2.892 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.569 (sq.in.)
VOLUME = 697.5 (c.c.)

WET DENSITY = 138.0 (Pcf)
DRY DENSITY = 126.6 (Pcf)
MOIST. CONTENT = 9.0 (%)

RATE OF SHEARING = 0.5 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES.= 3200 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.05	30.9
0.17	483.8
0.28	802.0
0.43	1129.4
0.57	1466.1
0.76	1923.7
1.00	2449.9
1.25	2881.7
1.49	3240.3
1.74	3475.3
1.99	3698.9
2.23	3851.2
2.47	3931.9
2.72	4032.3
2.97	4102.2
3.22	4181.3
3.47	4200.5
3.72	4239.3
3.97	4267.8
4.22	4296.2
4.47	4245.5
4.72	4303.2
5.22	4329.4
5.72	4355.2
6.22	4351.6
6.71	4318.9
6.71	4318.9
7.22	4152.2
7.72	4034.4
8.22	4003.2
8.72	4047.2
9.22	4034.6
9.72	3956.4
10.71	3968.1
11.73	3859.3



Dames & Moore, Inc.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-8
SAMPLE #: 7
DEPTH (ft): 29
DATE TESTED: 07-14-95
SOIL: SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

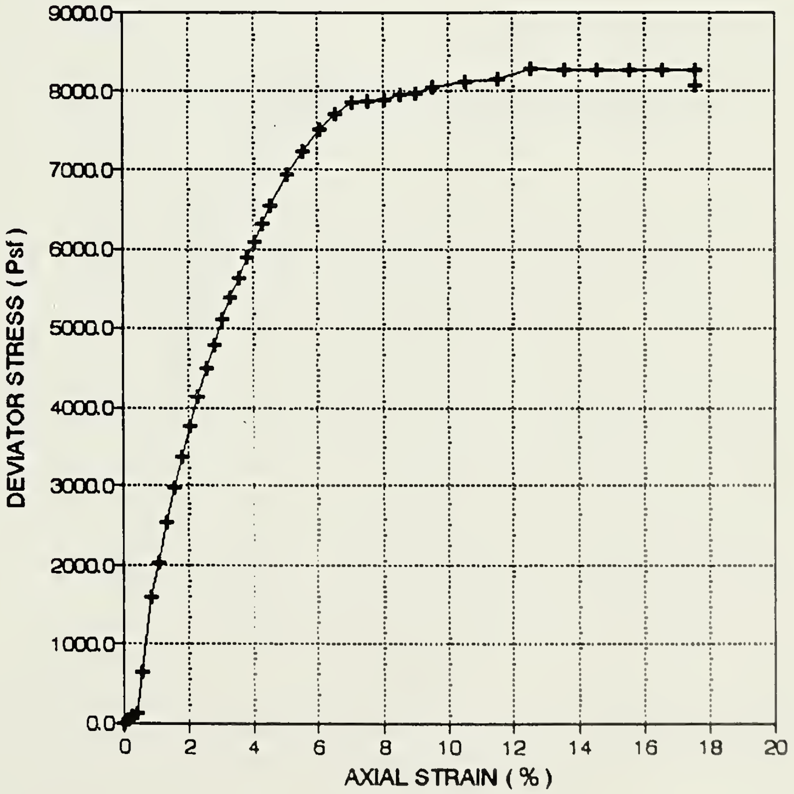
WT. OF WET SOIL + DISH = 1434.4 (gms)
WT. OF DRY SOIL + DISH = 1322.8 (gms)
WT. OF DISH = 46.3 (gms)
TOTAL WT. = 1529.5 (gms)
HEIGHT = 6.400 (in.)
DIA: (TOP) = (in.)
(MID) = 2.876 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.496 (sq.in.)
VOLUME = 681.3 (c.c.)

WET DENSITY = 140.1 (Pcf)
DRY DENSITY = 128.8 (Pcf)
MOIST. CONTENT = 8.7 (%)

RATE OF SHEARING = 0.5 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES.= 3500 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.12	41.7
0.27	83.2
0.41	124.6
0.61	632.2
0.85	1581.7
1.09	2021.3
1.33	2530.7
1.58	2975.9
1.82	3367.8
2.06	3757.7
2.31	4135.3
2.56	4490.6
2.80	4793.4
3.05	5104.4
3.30	5393.9
3.55	5641.6
3.79	5888.0
4.04	6083.0
4.29	6326.5
4.54	6558.7
5.04	6940.2
5.54	7228.8
6.04	7523.8
6.54	7717.8
7.04	7841.4
7.54	7856.8
8.03	7891.6
8.53	7953.8
9.03	7966.9
9.53	8045.9
10.53	8115.5
11.54	8143.7
12.55	8279.1
13.56	8264.5
14.57	8257.0
15.58	8264.5
16.59	8261.7
17.54	8261.7
17.55	8080.7



Dames & Moore, Inc.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-8
SAMPLE #: 10
DEPTH (ft): 36.5
DATE TESTED: 07-14-95
SOIL: SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

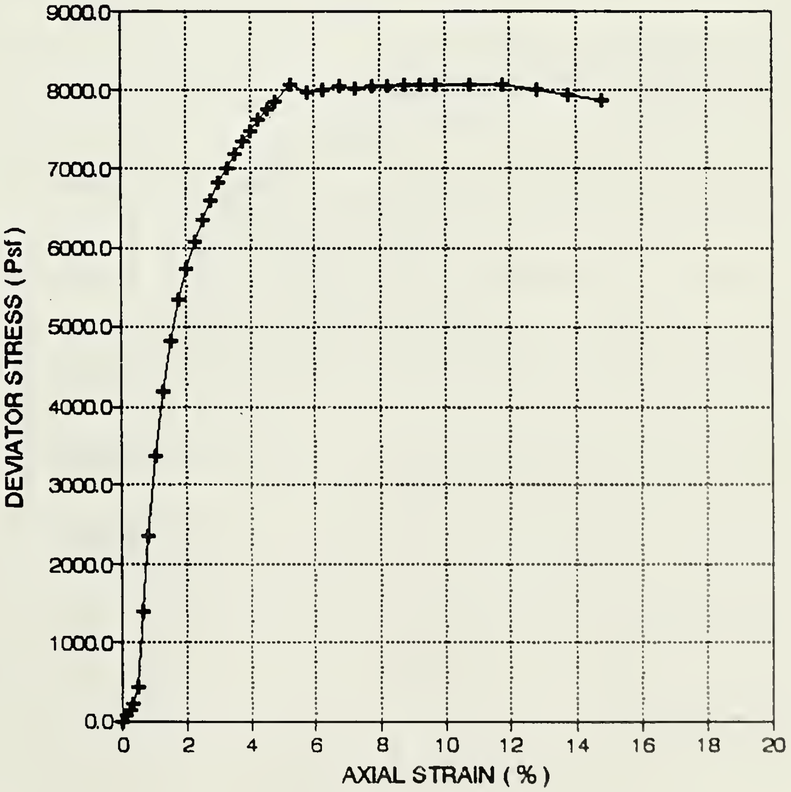
WT. OF WET SOIL + DISH = 1559.2 (gms)
WT. OF DRY SOIL + DISH = 1426.3 (gms)
WT. OF DISH = 167.5 (gms)
TOTAL WT. = 1521.3 (gms)
HEIGHT = 6.470 (in.)
DIA: (TOP) = (in.)
(MID) = 2.887 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.546 (sq.in.)
VOLUME = 694.0 (c.c.)

WET DENSITY = 136.8 (Pcf)
DRY DENSITY = 123.7 (Pcf)
MOIST. CONTENT = 10.6 (%)

RATE OF SHEARING = 0.5 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES. = 4450 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.12	62.0
0.23	144.5
0.35	216.5
0.50	432.4
0.64	1387.9
0.82	2349.9
1.07	3367.8
1.31	4186.8
1.55	4828.6
1.80	5334.6
2.04	5727.0
2.28	6076.5
2.53	6363.8
2.78	6599.1
3.03	6823.0
3.27	7006.0
3.52	7187.7
3.77	7348.4
4.02	7487.9
4.27	7627.0
4.52	7755.4
4.77	7843.6
5.26	8057.4
5.77	7966.0
6.27	8001.1
6.77	8045.1
7.27	8021.4
7.77	8045.1
8.27	8048.8
8.76	8061.8
9.26	8064.8
9.76	8067.3
10.76	8069.8
11.78	8078.6
12.79	8004.3
13.79	7938.9
14.80	7872.0



UNCONSOLIDATED UNDRAINED COMPRESSION TEST
(TX/UU)

CLIENT: ICF KAISER
JOB #: 30751-001-003
PROJECT: CALTRAIN EXTENSION
BORING #: B-8
SAMPLE #: 11
DEPTH (ft): 39
DATE TESTED: 07-14-95
SOIL: SOFT BEDROCK

SPECIMEN MEASUREMENTS:-

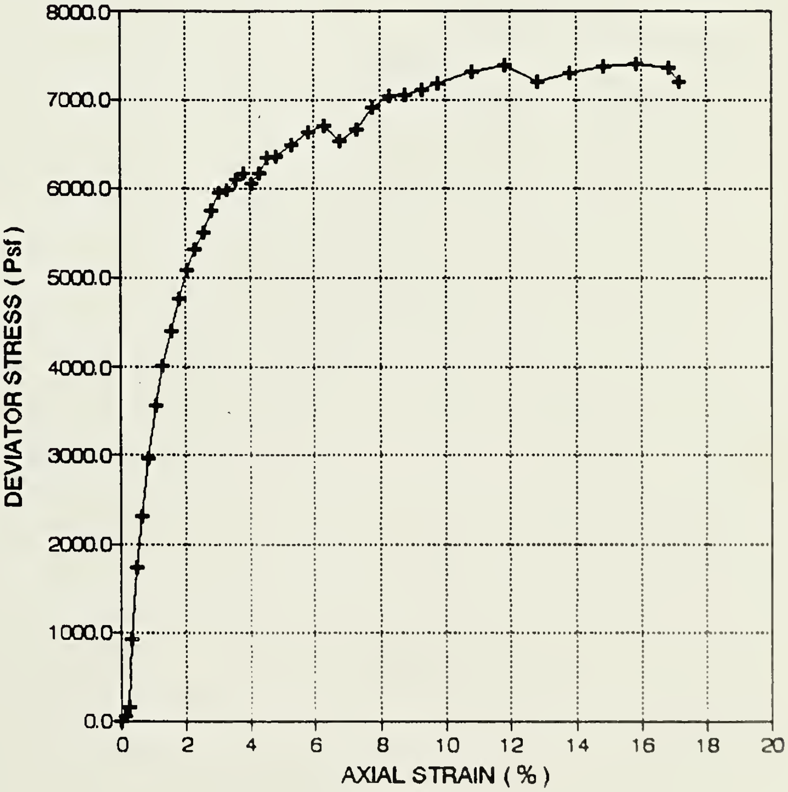
WT. OF WET SOIL + DISH = 1545.2 (gms)
WT. OF DRY SOIL + DISH = 1432.7 (gms)
WT. OF DISH = 166.9 (gms)
TOTAL WT. = 1538.4 (gms)
HEIGHT = 6.460 (in.)
DIA: (TOP) = (in.)
(MID) = 2.880 (in.)
(BOT) = (in.)
(AVERAGE) = (in.)
AREA = 6.514 (sq.in.)
VOLUME = 689.6 (c.c.)

WET DENSITY = 139.2 (Pcf)
DRY DENSITY = 127.8 (Pcf)
MOIST. CONTENT = 8.9 (%)

RATE OF SHEARING = 0.5 %/min
LOAD CELL = 2000.0 lbs.
CONFINING PRES.= 4800 psf

DATA REDUCTION:

AXIAL STRAIN (%)	DEVIATOR STRESS (Psf)
0.00	0.0
0.12	51.9
0.24	155.6
0.36	922.1
0.50	1738.0
0.64	2303.7
0.83	2959.1
1.08	3558.6
1.32	4011.5
1.57	4400.7
1.82	4767.3
2.06	5071.1
2.31	5312.1
2.56	5511.6
2.80	5740.3
3.05	5947.4
3.30	5992.4
3.55	6087.3
3.80	6171.3
4.05	6055.6
4.30	6169.2
4.55	6351.6
4.80	6364.4
5.30	6498.5
5.80	6630.8
6.30	6702.9
6.80	6541.0
6.80	6541.0
7.30	6669.9
7.80	6912.0
8.29	7046.3
8.79	7055.5
9.29	7111.2
9.79	7184.7
10.80	7317.6
11.81	7390.6
12.81	7206.6
13.83	7293.3
14.84	7375.7
15.85	7401.9
16.83	7367.8
17.17	7208.0



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2